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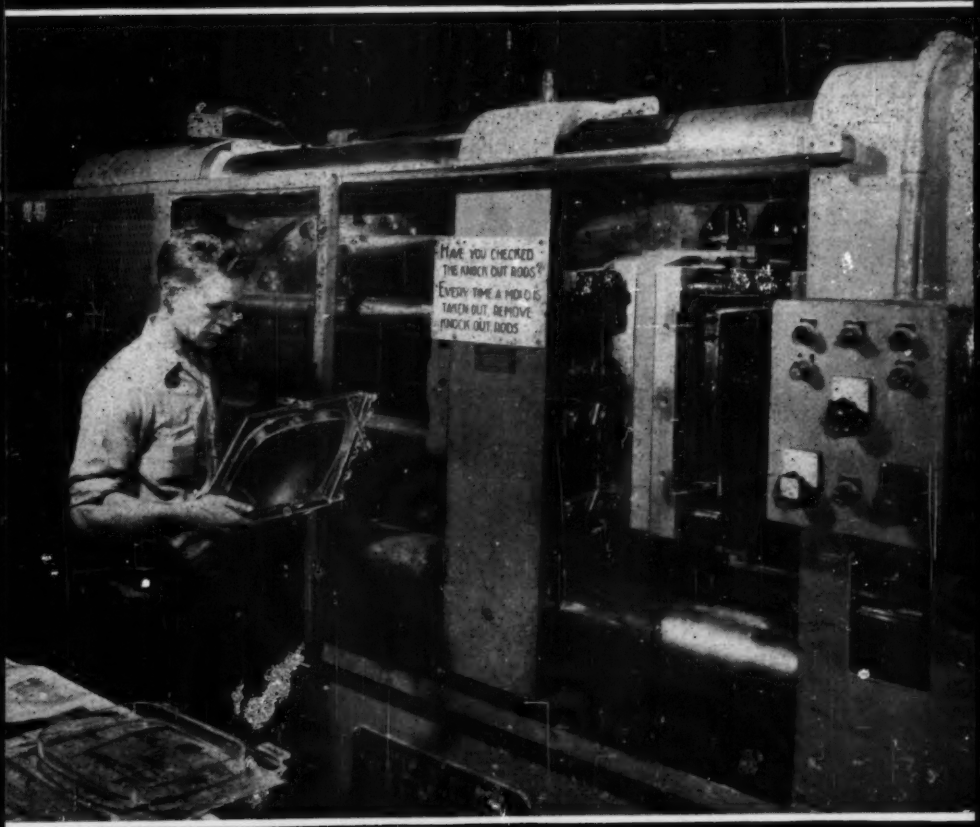
DECEMBER 1951

BUSINESS · ENGINEERING · INDUSTRY



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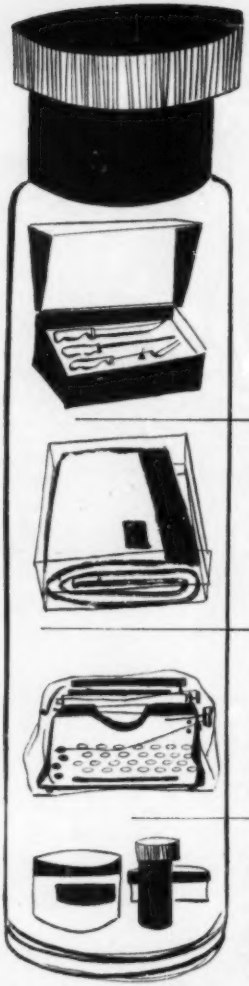

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McGraw-Hill DIGEST

VOLUME 6
NUMBER 12

Member—Audit
Bureau of Circulations

McGraw-Hill Digest is published monthly by McGraw-Hill International Corporation for circulation in all countries of the world except the United States and Canada. Publication and executive offices, 330 West 42nd St., New York 18, N. Y., U.S.A. Curtis W. McGraw, Chairman of the Board; Willard T. Chevalier, President; Eugene P. Warner, Vice-President and General Manager; Joseph A. Gerardi, Secretary and Treasurer; John F. Chapman, Vice-President; K. Presbrey Bliss, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Director of Circulation.

Subscriptions may be ordered through Director of Circulation, through local book dealer, or McGraw-Hill, Aldwych House, London, W. C. 2 (British only). Subscription rates: $5 for 1 year, $8 for 2 years, or $10 for 3 years; single copy 50¢ (U.S. currency). Entered as second-class matter December 17, 1947, at the post office at New York, N. Y., under the Act of March 3, 1879.

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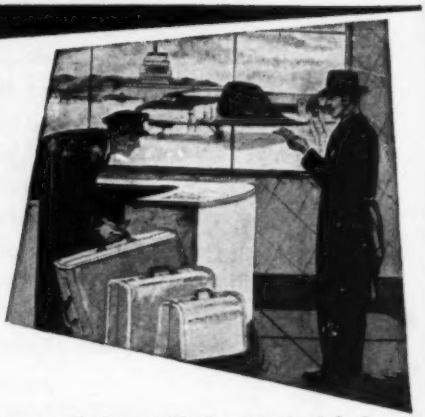
off to meet

YOUR BUSINESS PROBLEMS FACE TO FACE



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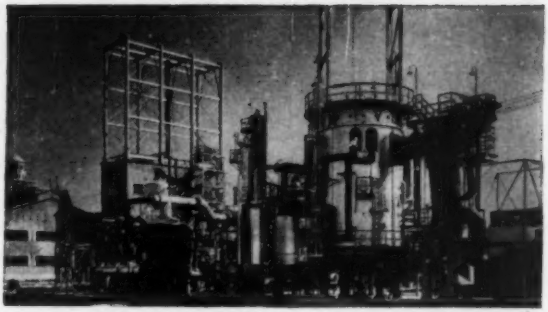

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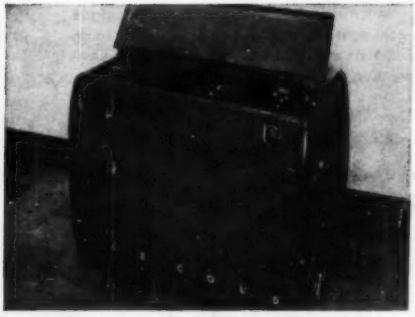

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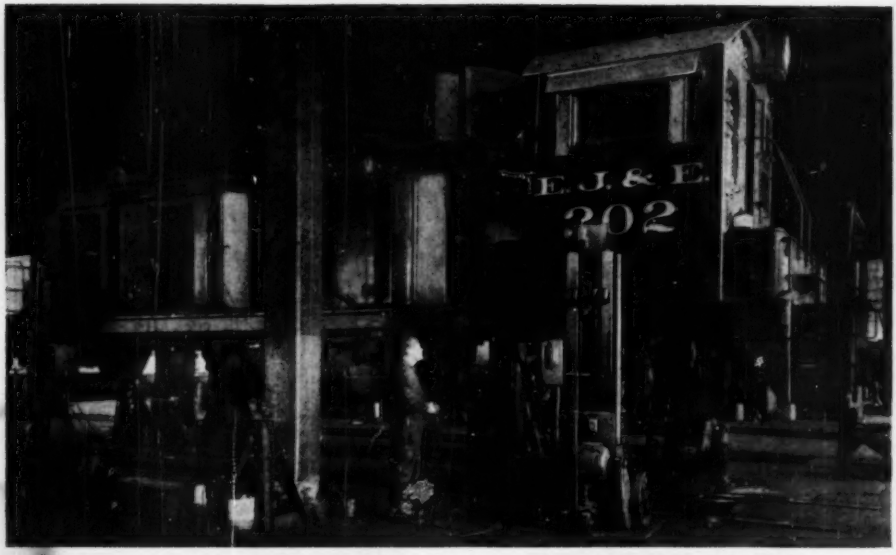

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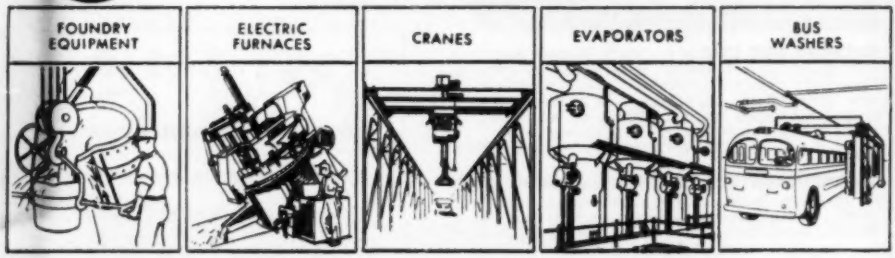

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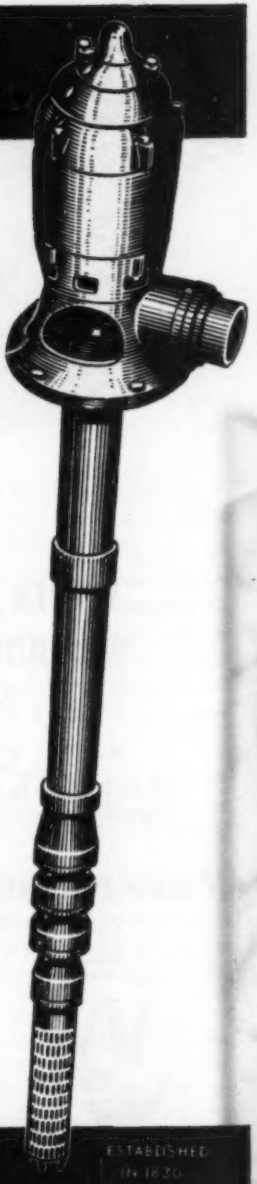

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BUSINESS TRENDS

GOOD BUSINESS—without too much inflation—highlights the outlook for the next 6 months. · Rising military spending, plus a continuing high level of capital expenditures by business, will keep pushing U. S. employment and industrial production higher.

Defense spending is the big force behind this outlook. U. S. military spending will rise from today's annual rate of about $45-billion to a rate of $55-60-billion in the second quarter of 1952.

The rise in spending is virtually sure, no matter what may happen in the international scene to slow the mobilization down later on. The present momentum of defense production—with industry working on orders that have already been placed—appears to be enough to keep business humming through the frst half of next year.

This increase in military spending will go almost entirely for "hardware"—planes, tanks, and other weapons made of metal. As a result, supplies of metals will be increasingly tight over the next few months.

Industry's capital expenditures will stay high, adding still further to the present huge demand for metal. Capital expenditures may be reduced somewhat by shortages of metals and their products; shortages of structural steel have already delayed many industrial expansion programs. But these same delays just about guarantee a high level of capital spending through 1952 because companies with projects held up now will finish them as soon as they can get the necessary materials.

The combined drain on supplies of metals means less durable goods for consumers. In the first quarter, makers of consumers durables will get 50%—or perhaps slightly less—of the steel they used in early 1950. This quarter's allocations were 58%.

All this is inflationary—good business is adding to consumers' incomes at the same time that it reduces the amount of goods they can buy. And high demand helps lead to price increases on metals. Some nonferrous metals have already gone up in price; steel and other metals are expected to follow the trend upwards. this winter.

But the outlook—in spite of all this—is for a minimum of inflation over the next 6 months or so. One reason is that there will not be much of a government deficit over that period. Another is the current unusually high rates of saving.

The biggest force against inflation is a good supply of soft goods. Enough food and clothing should be available to soak up much of the increase in con-

BUSINESS TRENDS (Continued)

sumers' incomes over the next few months—without much increase in prices. Total U. S. output of farm products this year is perhaps 4 or possibly 5% greater than in 1950. Crops are estimated at around 1949 levels, which makes this close to the second highest year on record. Bad weather cut some crops below the levels indicated earlier this year. But the over-all record for harvesting was excellent.

Supplies of clothing are more than adequate. And the huge cotton crop, about 50% over 1950 in spite of adverse weather, will help hold apparel prices down over the next 6 months.

Availability of soft goods will also hold down the cost-of-living index—food and clothing make up roughly 50% of the official index. This is important, because the wages of U. S. workers are increasingly being tied to the cost of living. As long as the index does not rise much, pressure for inflationary wage increases will be minimized.

SECOND HALF OF 1952 will see business outlook depending on politics, both in the U. S. and on the international scene.

Under present plans, military spending is scheduled to go on rising, till it reaches a peak of about $68-billion a year sometime in 1953. This program is still being increased, by adding more airplanes and atomic weapons. If the military spending program goes through on schedule, it means a big, inflationary government deficit—perhaps $15-billion or more in the fiscal year starting next July.

Domestic politics may change this. With a Presidential election coming up next fall, political parties will be anxious to attract voters. They might try to do that by lightening the burden of rearmament next fall.

Some relief from the defense load would please voters in all quarters—consumers, workers, businessmen, tax-payers in general. Consumers will be increasingly bothered by shortages of consumers' durable goods. Workers and businessmen find wage and price controls irritating. And taxpayers would welcome a reduction in the present high tax rates.

All these unpopular effects of mobilization—shortages, controls, high taxes—could be reduced by slowing down or eliminating the scheduled increase in defense outlays.

But defense can only be cut if international outlook is favorable. No U. S. politician will dare reduce the military program if he thinks war is a possibility—he will not want the blame if war finds the U. S. unprepared. That means that international developments—over the next 6 months—hold the real key to the U. S. business outlook for the second half of 1952.

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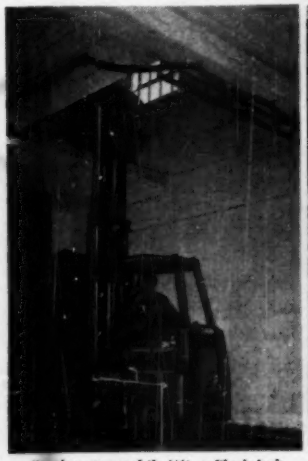

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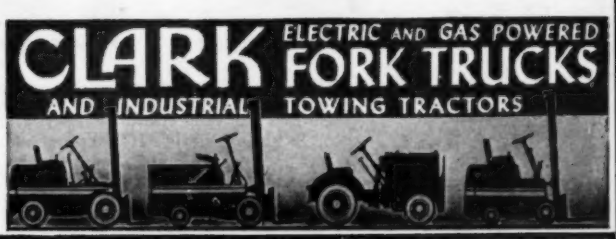

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WASHINGTON REPORT

MORE U. S. MILITARY AID to Britain soon, and perhaps to France too, is fairly certain. Two things make this so:

1. Churchill's victory by such a narrow margin means he will not be strong enough to carry out any fundamental economic reforms in Britain. So it looks as though he will have to ask the U. S. to help stop the outflow of British gold and dollar reserves.

2. The U. S. Congress will go all-out to give Churchill a hand. Reason: administration Democrats are committed to support almost any foreign-aid request. Republicans want a Conservative success in dealing with British economic problems so they can use it as campaign ammunition in 1952.

More aid to Britain would open the door to new requests from other European nations. France, the second strongest military power in Europe, has the best chance of getting an extra helping of dollar aid. But odds are that even more aid would not avert some scaling down on the European rearmament programs.

WASHINGTON is watching closely the new Bolivian experiment of calling in UN experts to help reorganize the government administration. The UN has loaned Bolivia ten crack administrators. They will work for from 2 to 5 years in posts just below the cabinet level in the ministries of finance, labor, agriculture, mines and petroleum, and other government offices.

Job will be to streamline Bolivia's governmental machinery; give continuity to policy-making. They will suggest fiscal reforms, help set up a local development bank, help reorganize the Central Bank, and help refurbish the social security system and the agricultural and mining development programs.

The U. S. State Department hopes this experiment may set a pattern for other countries where administrative inefficiency is one of the big barriers to economic progress. It hopes also that Bolivia will take the UN's advice soon and establish a formal investment code to encourage the flow of private foreign capital into the country. A UN economic survey mission recommended this step last year.

INCOME FROM U. S. INVESTMENTS ABROAD is climbing rapidly. According to a recent official report, income from foreign investments in 1950 was 24% above 1949 and double the prewar 1929 high. Direct investments returned 84% of the 1950 total compared with only 50% prewar.

American direct investments earned a total of $7.5-billion during the period 1946-50. Income from foreign investments accounted for 11.8% of total U. S. balance-of-payments receipts on current account last year. It was second only to merchandise exports as a money earner. This rising income rate spells steadily

increasing U. S. investments abroad in the years to come. The reason: more than half of total income was reinvested abroad in the last 5 years.

U. S. strategic-materials officials have put an unofficial price tag on the investment in the raw-materials production of under-developed countries that would be necessary to meet increased world demand. They estimate $20-billion worth of investments would be required within the next 2 years to supply raw materials for the additional 25% of world manufacturing capacity expected to be built during this period. At this time, it is estimated that not more than 50% is even in sight.

WORLD BANK is stepping up its efforts to procure scarce materials and equipment in the U. S. for its borrowers around the world. Its materials assistance section not only helps its clients get government defense-order priorities; it also, in many cases, sends its experts out to scour U. S. factories for the actual equipment needed.

The bank found 400 miles of power transmission cables, for example, for the $58-million Paulo Alfonzo power project in Brazil. Its experts scoured around until they found the cable in the stockpile of a big American company. The bank also is surveying the availability and location of reconditioned tractors in the U. S. Reason: rearmament is making it increasingly difficult to find new tractors for export.

Its materials assistance section acts as the borrowers' agent in dealing with U. S. suppliers when requested to. And it gives its clients free advice on possible substitutes for unavailable equipment. Its biggest job, though, is to get priorities for its clients. Here are some of the most important projects for which the bank has helped obtain priority assistance so far:

- **The Thailand irrigation project,** which will boost the country's rice output 500,000 tons. The bank got priorities for the construction equipment needed; also persuaded the Thailand engineers to buy rubber-tired tractors instead of the unavailable track-type tractors they originally requested.

- **An Australian power project** designed to ease the country's desperate shortage of electricity. The bank helped obtain priorities for $26-millions worth of semi-mobile "package" power plants.

- **The Paulo Alfonzo power project** in Brazil. The bank helped procure the generators as well as the transmission lines.

- **Other projects** being helped now include a $5-million Ethiopian road-building program; a series of Yugoslavian development projects involving the purchase of $6-million worth of U. S. equipment; an Iraqui flood-control project on the Tigris; a $33-million power expansion project in Uruguay.

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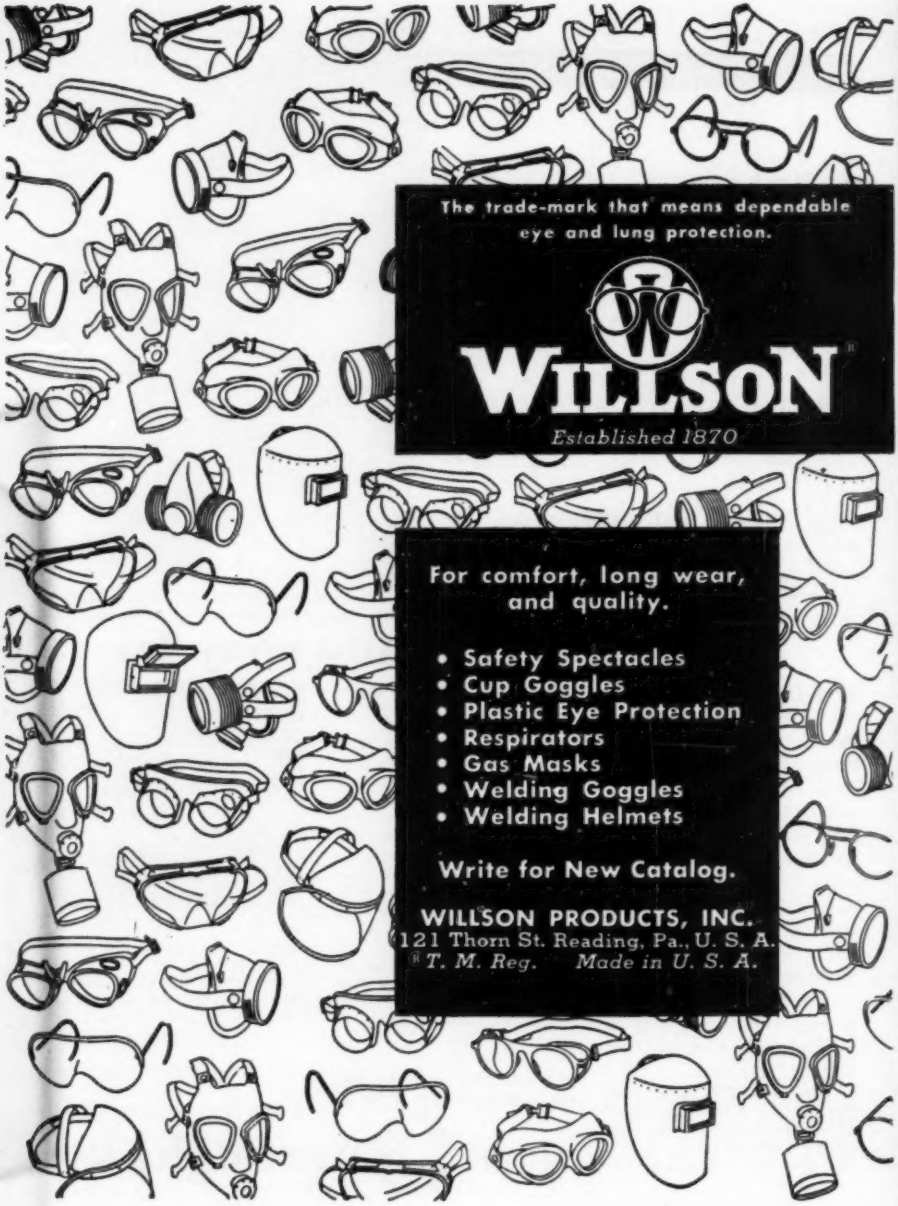

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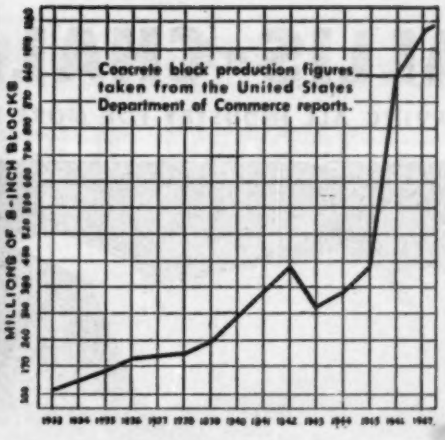
Concrete block production figures taken from the United States Department of Commerce reports.
MILLIONS OF 8-INCH BLOCKS

VIBRAPAC Concrete Masonry Constructed Buildings Assure—

FIRE SAFETY
STORM SAFETY
WEATHER TIGHTNESS
BUILT-IN INSULATION
LIFELONG DURABILITY
LOW UPKEEP COST
LOW INSURANCE RATES
EASY FINANCING
HEALTHFULNESS
VERMIN-PROOFNESS
STRUCTURAL BEAUTY
LOW BUILDING COST
RAPID CONSTRUCTION

. . . FAST PRODUCTION of High Quality Concrete Block Assures BIG PROFITS!

You want to invest your money wisely. A sound, profitable business today is concrete block manufacturing. The chart, shown above, reveals the amazing increase in block production. The upsurge in the building industry has created a tremendous demand for block. High-production Vibrapac machines can supply this demand. These dependable, fully automatic block machines produce high-quality masonry units on a much faster, more efficient basis. No skilled labor is required. And raw materials, such as sand, gravel, pumice, etc., are available everywhere. Investigate the profit possibilities of this fast-growing industry. Write today for literature.

RIGHT—Besser Vibrapac Machine, the modern, high-speed, fully-automatic block machine. Produces three 8x8x16 units at a time on one Plain Pallet. Other sizes in equivalent multiples. One man offbears full machine production.

BESSER MANUFACTURING CO.
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Complete Equipment for Concrete Products Plants

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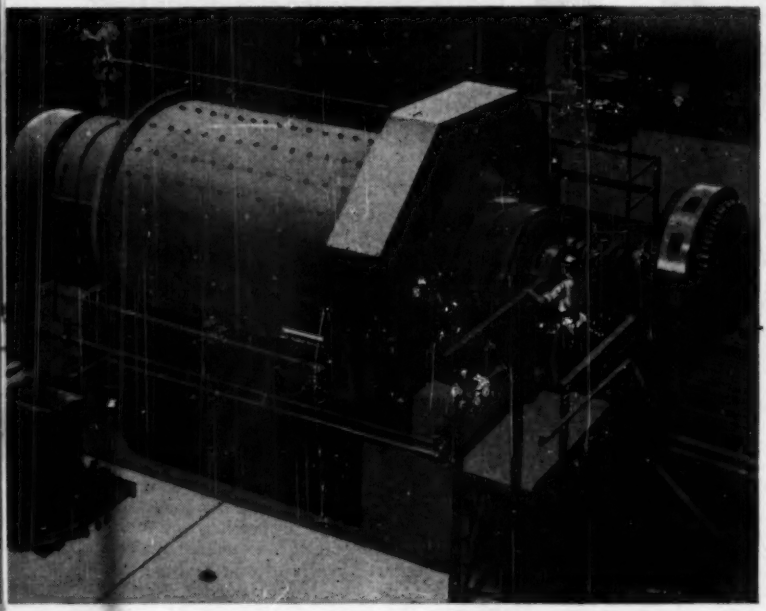
SERVING ALL INDUSTRY FOR MORE THAN A CENTURY



Grinding Raw Materials for Industry!

BEFORE basic material mined from the earth can be used to feed the machines of heavy industry, it must be processed. All over the world, grinding mills like the one above are used to reduce raw ores and other materials for further processing so that industry can then turn them into useful products for homes and for factories.

In more than 4,000 ore processing installations throughout the world, grinding mills designed and built by Allis-Chalmers grind the maximum tonnage with the least possible use of power and labor.

Grinding mills are only one of the products Allis-Chalmers provides for the processing industry. Whether one machine or an entire plant is needed, Allis-Chalmers provides a single source, single responsibility for equipment.

For help on machinery problems in this or any of the many basic industries that Allis-Chalmers serves, consult the Allis-Chalmers representative in your country, or write:

ALLIS-CHALMERS MANUFACTURING CO.
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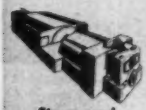

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BASIC MACHINERY FOR THE WORLD'S MAJOR INDUSTRIES

December 1951 • McGraw-Hill DIGEST • Volume 6 Number 12

Materials Control in Danger

The job of the International Materials Conference has not been easy and is getting harder day by day as consumer-producer interests clash

ANOTHER major raw-materials crisis is due in the next couple of months. The outcome will determine the future world distribution pattern of raw materials and whether or not the non-communist powers will be able to check inflation. And the crisis will strain severely the political unity of the free world.

The brewing storm will break at the International Materials Conference before year's end. Prices of key scarce materials and the problem of adjusting military versus civilian demands will be the big issues.

Price is the major hurdle. The IMC has succeeded in allocating all its key commodities this quarter, but it has failed so far to tie any effective price agreements to its allocations. For instance, IMC put a $65-per-ton ceiling on tungsten in the third quarter, but Brazil balked and sold its tungsten at upwards of $80 a ton. And the IMC tungsten committee has not yet been able to hammer out a fourth-quarter tungsten price deal.

Results of No Price Tags

IMC's failure to pin up price tags has had three serious results: (1) U. S. imports of key materials have been strangled by domestic price controls that hobble American bidding in world markets. (2) The effectiveness of all international allocations is threatened. (3) World inflation has not been checked.

Price ceilings have hit U. S. imports hard. Best examples are lead, zinc, and copper. U. S. imports of lead have slumped 60% since imposition of ceilings. Zinc imports are down 25%; copper imports down 66%.

Price Agreements Needed

IMC now realizes that allocations will not work without parallel price agreements. Some countries will have trouble taking up their allocations for price reasons, either because of internal price ceilings, like the U. S., or for balance-of-payments reasons. And producing countries are becoming more and more reluctant to allocate their commodities in a rising market that favors hoarding.

So the IMC has reached the point where it must push ahead and get some price agreements—or collapse. Failure of the IMC would banish all hope of international raw-materials control and open the door to a new round of furious inflationary bidding for raw materials.

The U. S. would get the major share in any such free market—just as it did right after Korea. But it could lose allies in the process. So it is ready to give IMC another chance.

U. S. officials believe they have a strong case for insisting that the IMC put price tags on its commodities. So far, the U. S. has made most of the sacrifices to make international control work. The U. S. voluntarily stopped competitive bidding for world raw materials after the flurry of post-Korean buying highlighted the inflationary dangers of a bidding war.

The U. S. shared its sulfur and

molybdenum, and put low ceilings on internal raw-materials prices. Stockpile buying was cut back. Some stockpiles even were drawn on.

Meanwhile, most foreign producers have continued to demand all the market would bear. And most foreign consumers have continued to pay the producers' prices.

Two Approaches Possible

IMC will attack the price problem in two steps. First, it will try to get general agreements among producers and consumers. Then, if this approach fails, it will try to mobilize the consumers under unified price-ceiling agreements. Both approaches are mined with difficulties and dangers.

Producers, so far, have strongly resisted any ceilings on their prices. And they have a good case. They argue that it is unfair to expect them to hobble raw-materials prices during the rearmament emergency when they have no guarantee that the prices of the manufactured goods they import will not continue to creep up or will not skyrocket relative to raw-materials prices when the emergency is over. They recall bitterly how manufactured-goods prices boomed after World War II and how prices of primary products sagged.

What IMC Can Do

IMC can do several things. It can offer producers long-term purchase contracts (5 years or more) containing minimum as well as maximum prices. It might even be able to put escalator clauses, tied to general price levels, in these price agreements.

It also could try to exact some promises from consumers concerning long-term stockpiling policies. One thing that scares producers now is the threat that consumers will start liquidating stockpiles once the emergency is over. So producers may see enough long-range protection in price agreements to be willing to come in and to sacrifice short-term profits for long-term security.

One thing is certain. IMC's powers would have to be strengthened and broadened to include jurisdiction over more commodities because it probably would be impossible to get a price agreement for any one commodity without getting them simultaneously for the majority of scarce commodities. Belgium, for example, would balk at accepting a ceiling on its cobalt and copper exports unless it were assured that it would not be gouged by suppliers of its raw-materials imports, such as for French aluminum.

A Stronger Conference

So IMC probably would have to work out an interlocking pattern of agreements before it could get a price deal on any one of them. This would require strengthening its advisory central committee into a powerful coordinator of its various autonomous commodity committees. It would mean giving IMC control over such materials as aluminum, tin, rubber, industrial fats and oils, iron and steel, and perhaps petroleum. It also would require giving IMC delegates the power to sign price accords.

These staggering difficulties will probably prevent the IMC from working out producer-consumer price agreements. Chances are better that consumer countries may be able to band together and unify price ceilings on their raw-materials imports. These ceilings would follow the pattern of U. S. price controls. But they probably would have to be somewhat higher.

This course of action would risk split-

. . . Where They Are Needed and at Fair Prices

ting the free world into two hostile camps of consumers and producers. And it is not certain which camp would win. Consumer countries are desperate for raw materials, and the producers might boycott them into submission to high prices. Also, even the attempt to mobilize the consumers against the producers would create major political headaches. Britain, for example, might find it politically impossible to join the U. S. in bucking Commonwealth raw-materials producers.

Floor Prices Would Help

But if the consumers' unified price ceilings were reasonable and made even more attractive by long-term purchase contracts containing minimum prices, producers might cooperate. Many producers would prefer to have price ceilings dictated to them by consumers rather than worked out on a producer-consumer basis. They would not then have to carry home the political responsibility for the ceilings.

Factors that favor a consumers' agreement on unified price ceilings are Britain's present willingness (contrasted to her attitude a year ago) to work out a price deal, the anxiety of other European countries over mounting prices of imported raw materials, and the menace of unrestrained bidding for available supplies. Wild bidding may be so menacing to other consumer countries that they may welcome a consumer price deal.

If the IMC succeeds in clearing the price hurdle, it will face another critical challenge—that of keeping some kind of a check on skyrocketing military demands for raw materials. At some point, military requirements must be curbed if the whole economy of the free world is not to be fatally upset.

This will be a tough assignment. IMC now is playing with various possibilities for international screening of military requirements. But no nation is likely to submit its military plans for international screening.

A better hope is this: IMC has requested its members to furnish statistics on actual use of raw materials for military purposes. Over a period of time, these statistics may provide a measure for the validity of future military demands. This is part of a general trend in IMC toward basing allocations on actual current consumption.

If IMC survives these trials, it should be able eventually to play a useful role in the struggle to boost the free world's supplies of essential raw materials. It already has turned out some valuable reports on ways to increase supplies and on the use of substitute materials. And it may grow into a key defense instrument for international economic cooperation.

Serious Cold-War Danger

Here is pointed up one of the long-run dangers of the cold war. Because if IMC succeeds in regimenting the world raw-materials market, the non-communist powers may find it difficult to cast off the straightjacket even when there is no longer any need for it. Agreements hammered out now may make free world trade governed only by supply and demand that much harder to get 5 years from now.

Free Equipment Show

That, essentially, is what our department, "Production Ideas from Manufacturers' Catalogs", is intended to be. It brings you news on what America is doing in the design and manufacture of all kinds of machines and equipment—and materials, too. So ask us by coupon for the catalogs you want, and we'll ask the manufacturers to send them directly to you. This month—on page 65.

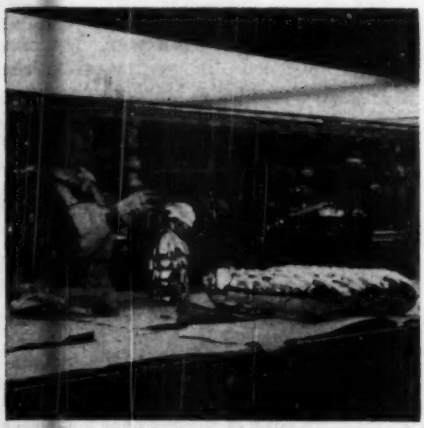
Direct Lighting . . .

. . . of high intensity (100 footcandles) is provided for cloth inspection. Bank of three 40-watt industrial reflectors are installed at an angle over each inspection station.

How To Light for Inspection

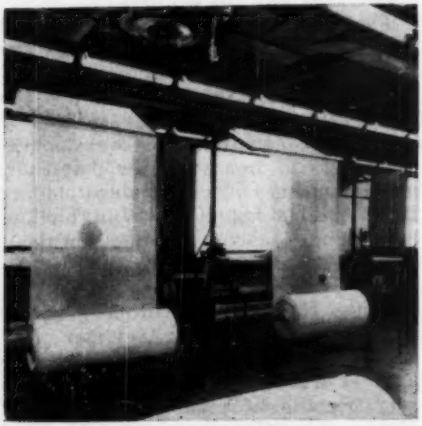
Fast, accurate inspection demands different lighting for different products. These excellent ideas are taken from Elec C&M, Oct, p91

Panel Light . . .



. . . with uniform low brightness aids inspection of polished surfaces, such as chromium plating. Light source is reflected from the metal surface, giving excellent illumination.

Transillumination . . .

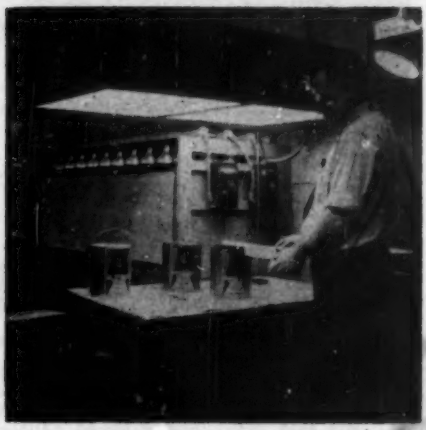


. . . for cloth inspection is provided by 40-watt daylight fluorescent lamps behind a glass panel, thereby creating a luminous background, to make inspection quick and easy.

Traveling Lamp . . .

. . . and mirror at end of telescope passes down gun barrel so imperfections are reflected by mirror to operator viewing from other end of telescope. Unit is in use at Naval Gun Factory.

Mixed Light . . .

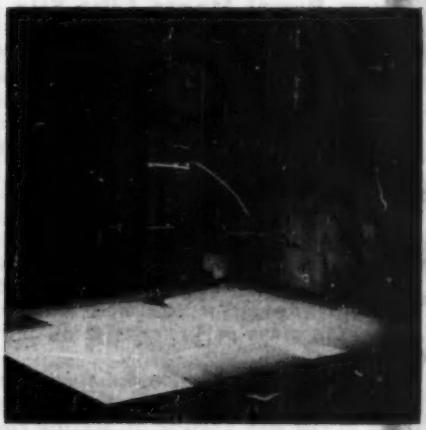


. . . has spectral qualities needed for color matching. Unit gives high intensity of 200 foot-candles from combination of incandescent and fluorescent lamps.

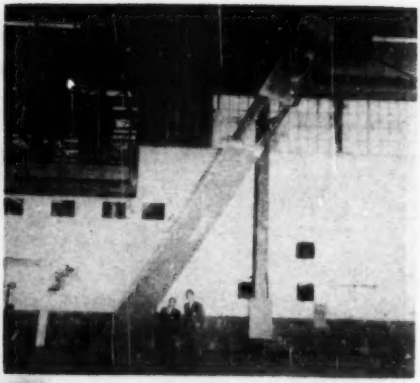
Table-top Panel . . .

. . . provides suitable light source for inspection of parachute seams by transillumination. Fluorescent lamps underneath light the luminous panel, diffusing the light well.

Polarized Light . . .



. . . can be adapted for inspection of some transparent materials, such as this vinyl laminate for safety glass. Made clearly visible are stains and strains in the material.



GIANT WING SECTION IN ONE PIECE

An integrally stiffened wing piece, 32 ft. long by 4 ft. wide, will be mass-produced on Lockheed Aircraft Corp.'s new Gidding & Lewis skin mill. Self-stiffened panel—a 323-lb. aluminum-alloy strip—was cut from a 3,340-lb. slab. It replaces complicated assemblies that normally would be composed of about 1,500 parts. More than 300 manhours of riveting are eliminated by the panel makeup.—Aviation Wk, Oct 22, p47

Glass Panel Heats Like Sun

Electrically heated glass panels are saving one company $2,000 to $3,000 a year in heating bills. Continental Radiant Glass Heating Corp., which makes the heating panels, says its system is truly radiant heating.

Heart of the panel is the glass plate, onto the back of which has been fused an aluminum grid. Electricity passes through the aluminum and heats the glass to over 300° F. But instead of converting some of the electricity to light, the glass panel turns it all into heat.

The glass lengthens and distorts the infrared rays so that they behave like rays of the sun. Instead of heating the air, they heat the objects they strike. One panel can heat 1,000 cu. ft. of volume.—Business Wk, Sept 25, p44

Design and Fabrication of Metal Refractory Alloys

Metal-refractory alloys are relatively new engineering materials that have potentially a large field of usefulness. But their high melting temperatures limit fabrication of parts to powder metallurgical processes, including cold pressing and sintering, hot pressing, and infiltration.

To conform to powder-metallurgy limitations, part design should avoid: (1) abrupt changes in thickness; (2) non-uniform cross sections; (3) sharp corners; (4) internal angles without fillets.

The extreme hardness of the alloys after sintering or infiltration requires rough machining or grinding of parts in the pre-sintered condition. After final sintering, surfaces must be ground with diamond wheels for fine finish or close tolerances.

A recently developed machine is reported to cut, thread, drill, and perform other machining operations on fully sintered carbide or boride base alloys. Holes and other openings can be formed in diameters from 0.007 to 2 in. with tolerances of 0.002 in. Cutting is done by rapidly oscillating a blunt tool against the alloy part.—Prod Eng, Oct, p147

Air Ejector Unloads Press

A curved piece of pipe and a jet of air make a high-speed press almost automatic at Reid Products Div., Standard Products Corp. Air blows each piece off the press, through the pipe into a keg.

Company mechanics attached an air feed line with a nozzle at one side of the press bed. Opposite it is a 2-in. pipe leading down into a covered keg. As the ram goes up, the small part is blown up from die.—Factory, Oct, p122

Preplaced Aggregate Grouted for 8-Ft. Slab

Pumping grout into preplaced aggregate was the method of constructing an 8-ft.-thick base slab for the Whittier Narrows Dam in Calif. The foundation mat, 546x110 ft. in plan, supports nine 50-ft.-wide radial gates in the spillway structure of the dam. This connecting procedure assures structural integrity of the spillway assembly.

After outside forms were erected, aggregate and reinforcing steel were preplaced. Aggregate was placed by clamshell crane. No special compaction was required.

Along with aggregate placement, 1¼-in. dia. grout pipes were placed extending to the bottom of the slab. Each "pour" consisted of a slab 36⅔ ft. wide by 182 ft. long. Preplaced aggregate was first thoroughly soaked with water for 24 hr. immediately preceding pumping.

Grout was pumped into the first row of pipes until the bottom of the second grout pipe row was covered. Then pumping in that row was started. As grout built up in a row, the pipes were gradually pulled up.

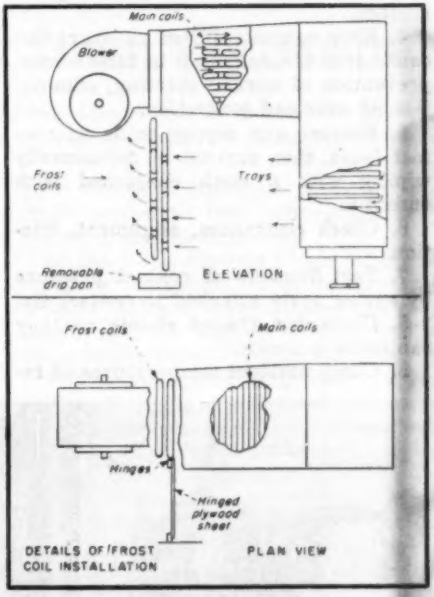
Grouting through any one of the pipes was stopped when grout rose to the surface around the pipe. A top form was then placed on the aggregate and grout was injected through it to bring mortar to grade.—Eng News-Rec, Sept 27, p32

Tests Antibiotics

Physicians can now determine quickly and accurately the most effective antibiotic to use against a specific infection in a patient. C S. C. Pharmaceuticals packages a set of test tablets of the six most common antibiotics in a unit.

To make the test, the doctor puts up to six tablets on a petri plate containing agar and the test organism. The plate is then incubated over night. Measuring the diameter of the inhibition zone around each tablet gives an accurate indication of the organism's qualitative and quantitative sensitivity to the antibiotics.

Two strengths of each antibiotic are provided. Tablets are unit packaged in Pliofilm to protect them from contamination. Each tablet in a group is positively identified to prevent confusion.—Mod Packaging, Sept, p109



HOW TO RAISE FREEZER OUTPUT

Food freezer capacity at J. H. Dulany & Sons, Inc., was increased by adding a separate frost-collecting coil ahead of main cooling coil. Result is no shut-downs for defrosting. Moisture from foods to be frozen is picked up by front coils, which can be defrosted in 5 min. without interrupting freezer operation. Plywood sheet deflects air during defrosting.—Food Eng, Oct, p5

How To Make Sure Controls Keep Operating Properly

Preventive maintenance keeps electrical controls working properly. Here are ten checks to make:

1. Make sure all connections are tight. Loose contacts increase electrical resistance, develop heat, cause oxidation.

2. Keep operating parts clean. Blow dirt off with 30- to 50-psi. air.

3. Inspect contacts for roughness. Dress by filing and sandpapering, or replace.

4. Keep controls dry as moisture can cause grounds, resulting in false starts, prevention of normal starting, elimination of overload protection.

5. Remove any copper oxide on contact faces, then prevent by occasionally wiping with a cloth moistened with vaseline.

6. Check clearances, alignment, friction.

7. Test firmness of contact pressure by spring scale attached to contact tip.

8. Check for frayed shunts as they can cause grounds.

9. Check ambient temperatures of relays. High ambients from adjacent heat sources cause premature operation.

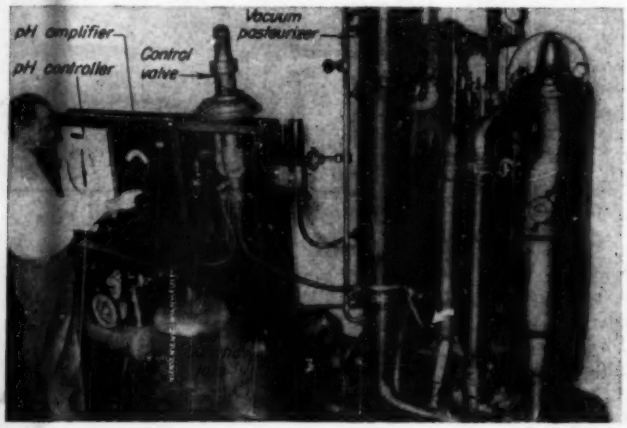
10. Operate controls at rated voltage. Over-voltage shortens coil life; under-voltage causes sluggish action.—Power, Oct, p122

New Anti-Fouling Sparkplug

New sparkplug developed by Boeing Airplane Co. is designed to give better protection to electrodes from wear and tear in the cylinder. It also will prevent carbon buildup, insure more precise control of heat, and raise combustion efficiency.

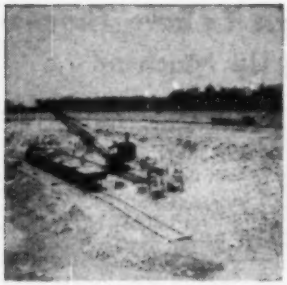
Electrodes on the sparkplug do not project into the cylinder. Instead, they are recessed within the plug's structure in a "pre-combustion chamber". The chamber, a venturi-shaped affair, opens into the cylinder and shields the points.

Configuration of the chamber is such that it produces a jet-like flame that spurts out from the plug with the explosion well developed by the time it reaches the cylinder. This action produces more complete and uniform burning of the fuel and purges the plug chamber of carbon—Aviation Wk, Oct 15, p48



UNIT CHECKS CREAM pH

Acidity of pasteurized cream during processing is determined by pH control unit at Goldenrod Creamery in Wisconsin. Flow of caustic from glass jars to vacuum pasteurizer is regulated by pH controller that actuates reagent control valve to dispatch required amount to pasteurizer. Advanges: no guess work, better flavor, increased processing efficiency, no saponification. — Food Eng, Sept, p98



GYPSUM from mines like this reacted with . . .

AMMONIA CARBONATE made from ammonia and carbon dioxide from ammonia synthesis like this . . .

Makes Fertilizer from Gypsum

Sulfur shortage emphasizes importance of a shift to gypsum as the sulfate source in the synthesis of ammonium sulfate

RECENT DEVELOPMENTS in the U. S. and in India have focused renewed attention on the manufacture of ammonium sulfate for fertilizer from calcium sulfate and ammonium carbonate.

The process is not new. First tried unsuccessfully in Austria in 1809 and again unsuccessfully in 1909, it was commercialized in Germany during World War I by Badische Anilin and Soda Fabrik at Oppau. A second German plant was built at Leuna.

Both operated until World War II. Oppau is again operating, but the fate of Leuna, behind the iron curtain, is unknown.

Two plants have also operated in England—at Billingham and Prudhoe —one since 1923, the other since World War II. Their operation furnished the know-how for the new Indian plant at Sindri, about 125 miles north of Calcutta.

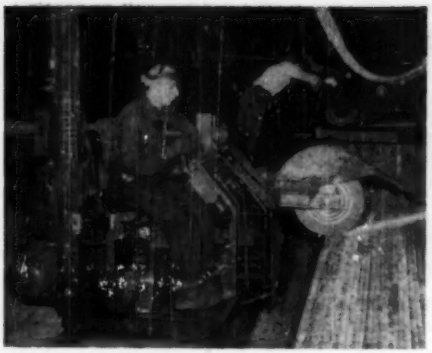
This 1,000-ton-a-day plant synthesizes ammonia from coal, while the calcium sulfate (gypsum) is mined in southern India. The ammonia plant also provides the huge tonnages of carbon dioxide needed to form ammonium carbonate from the ammonia.

In the U. S., Phillips Chemical Co. is studying the possibility of making ammonium sulfate from ammonium carbonate and the calcium sulfate sludge from triple superphosphate plants.

The major operating problem in the process is the reaction of the carbonate solution and the finely ground calcium sulfate. An excess of carbonate is used to shift the equilibrium in the direction of maximum production of ammonium sulfate. Even so, the reaction takes 5 hrs. when carried out at 70° C.

Precipitated calcium carbonate is filtered from the reaction mixture with rotary filters. It is used in England both as agricultural limestone and in cement manufacture.

After precipitation of the calcium carbonate, excess ammonium carbonate is removed by heating the solution in a salting type evaporator. The ammonium sulfate can then be crystallized.—Chem Wk, Oct 13, p33



GRINDER CUTS SNAGGING COSTS

Automatic snagging grinder cuts conditioning costs of stainless-steel slabs at Rotary Electric Steel Co. Grinder, built by Mid-West Abrasive Co., reduces metal loss, saves worker effort, eliminates hazards of swing grinding. It rides tracks parallel with the slab. Wheel moves on boom.—Iron Age, Sept 27, p90

Skin Cuts Stalling Speed

The U. S. National Advisory Committee for Aeronautics is studying methods for reducing stalling speeds and improving stability characteristics at these low values for safer landings. Flight trials have been made in a conventional high-wing plane fitted with a skin of porous metal along the leading edge of each wing.

Ducts behind the leading edge are connected to an exhaust system that sucks air through the porous skin. At low speed, the suction reduces turbulence, inducing a smooth flow of air over the wing to increase lift and delay the stall.

Serving the same purpose as slots or slats, the suction method delays separation by taking off the boundary layer and blowing the air over the ailerons to increase control effectiveness or dumping it overboard through fuselage exits. —Aviation Wk, Oct 8, p31

Seven Ways To Save Time in Setting Up Machine

Speeding up output in a machine shop is more than only speeding up the machines. Another help is to expedite machine setup by using certain mechanical devices as:

1. Master piece to save excessive number of trial cuts on automatic machine job.
2. Multiple-tool blocks holding preset toolbits that can be changed quickly.
3. Hardened locating surfaces set to predetermined depths so milling cutters can be set quickly and accurately.
4. Universal jigs in drilling departments to reduce tool-design cost.
5. Common or special vise jaws that can be inserted in a vise already clamped to the machine table.
6. Sturdy indexing fixtures, of universal nature, that can be mounted vertically to radial-drill tables for the convenience of swinging box-type jigs in different positions.
7. Air chucks to save both setup and cycle time.—Am Mach, Sept 17, p129

Product-Design Shorts

▶ If you are having trouble removing fins from molded rubber parts, try dry ice in a tumbling barrel. Dry ice freezes projections, makes them brittle so they break off as barrel rotates.

▶ New cause of failure of aluminum bronze ring in a water system is reported by Sam Tour, Inc. Ring abutted a nylon gear. Reaction of nylon and water produced ammonia, believed to be cause of stress corrosion in the ring.

▶ Super-fine steel tape, 0.0005 in. thick and 8.5 in. wide, is rolled on new cold-roll mill at U. S. Naval Ordnance Laboratory. Strip is rolled through an oil-filled chamber. Tape uses: pulse transformers, magnetic amplifiers, guided missiles.—Prod Eng, Oct, p5

Automatic Frequency System Based on Floating Core

Many electromechanical automatic frequency systems employ motors, with associated control circuits, and elaborate gear boxes. A system developed by Philips Telecommunication Industries laboratories in Holland eliminates all these mechanisms.

Basis of the system is a metal core that moves freely inside a tube made of insulating material and filled with fluid. The core is moved electromagnetically to effect changes in capacitance. Advantages include:

1. High sensitivity.
2. No hunting.
3. Gear box replaced by fluid damping.
4. Floating core not affected by mechanical vibrations.
5. Small dimensions and weight.
6. Small electrical circuit needed to drive the core.—Electronics, Oct, p270

Miscible Cube Tints Paints

New application for miscible package is a transparent wrap for new cubes of semi-solid color concentrates to be added to base paints at the time of purchase in the retail store.

Outer package of McCabe Paint & Varnish Co. colorants consists of a cellophane-wrapped, cube-shaped carton measuring 1¼ in. that contains the cube of colorant wrapped first in the miscible film and then overwrapped in lacquered glassine. Chief advantage of the miscible unit is the accuracy of formula it permits in matching colors correctly for the consumer. There is absolutely no waste.—Mod Packaging, Aug, p88

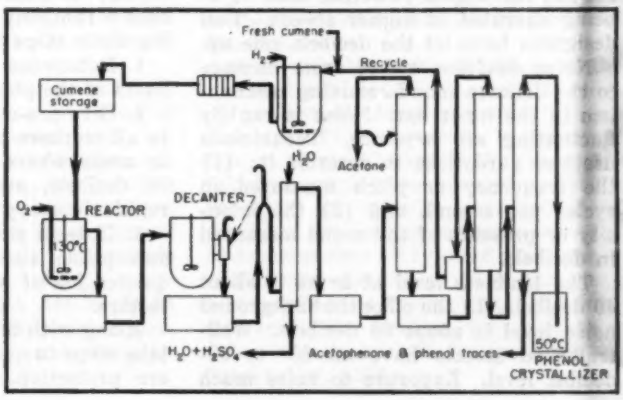
Steps Up Brake Power

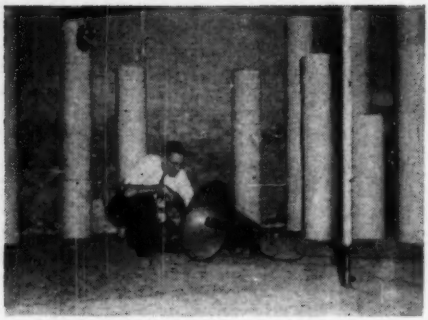
The brake pedal on an automobile as it appears today is due for a change. Bendix Aviation Corp. has a new power-assist device to ease the driver's braking effort. The brake pedal will look like the accelerator pedal. And it will move only 3 in., instead of 6 in. The right foot will be able to shift from accelerator to braking movement in one-fourth the time and cut the stopping distance.

To get the short pedal travel, Bendix ties a vacuum cylinder into the hydraulic brake system. The booster supplies about half the braking effort.—Business Wk, Oct 6, p52

MAKES PHENOL

Phenol soon will be made from cumene at new Allied Chemical & Dye plant. Process starts with benzene but omits sulfonation and chlorination. Cumene is made from benzene and oxidized to cumene hydroperoxide, which splits into phenol and acetone.—Chem Eng, Oct, p215





ECHO CHAMBER bounces sound from wall to wall. Acoustical materials are tested.

ECHO-FREE room at Armour Research is deadly quiet. Wedges soak up all sound.

Noise Deafness: Some Cures

Industrial deafness caused by industrial noise takes its toll of workers' health and productive capacity. Here are some cures

PLANT MANAGERS have long known that factory noise is a bad thing, that it cuts worker efficiency. Now they are beginning to get a more exact measure of how bad noise is—in terms of compensation payments to deafened workers.

Noise level inside factories has been steadily rising through the years. Machinery is higher-powered, and it is being operated at higher speeds. Tool designers have let the decibels pile up.

Noise deafness comes from damage to the delicate sound-receiving mechanism in the inner ear. Noise is rapidly fluctuating air pressure. Technicians use two yardsticks to describe it: (1) the frequency or pitch measured in cycles per second, and (2) the intensity or pressure of the sound measured in decibels.

The loudness level at home is about 40 decibels. In the office the background noise level is about 60 decibels. Well-trafficked streets have an 85- to 90-decibel level. Exposure to noise much above 130 decibels for any length of time is sure to damage permanently the hearing mechanism.

One way to reduce the incidence of deafness in a plant is to make the plant quieter. Another way is to screen your workers, putting those with noise-susceptible ears in quiet parts of the plant.

The American Academy of Opthalmology & Otolaryngology recommends that a company go through the following three steps in its screening process:

1. Determine the noise levels in all parts of the plant.

2. Give pre-employment hearing tests to all workers who are to be stationed in areas where the noise level is over 90 decibels, and give follow-up tests regularly every month or two.

3. If tests show a worker has noise-susceptible ears, transfer him to a quieter job or make him wear ear protectors.

Along with tests, the company should take steps to quiet a plant for its workers' protection. Any cost involved will

pay for itself in higher productive efficiency.

Armour Research Foundation specializes in quieting machinery and equipment. It analyzes a piece of machinery from a noise standpoint by first finding the noise-making sources and then components that transmit and amplify it. (McG-H Digest, Aug, p28).

It is not always the actual noise source, such as an electric motor, that is the offender. Sometimes the machine itself acts like the sound box of a violin, amplifying the motor noise. In such cases, the quieting job can be done quite simply by isolating the motor or gear noise from the rest of the machine. Some sounds are air borne. These can be isolated by enclosing the part in a sound-proof container.

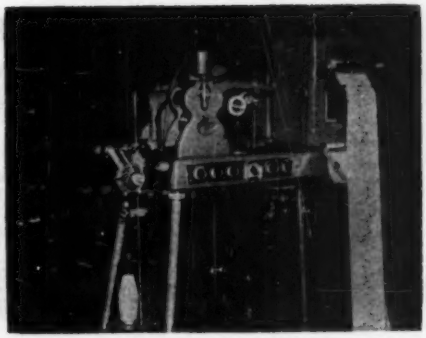
Acoustic treatment for both manufacturing areas and offices can go a long way toward cutting down industrial noise. Acoustical treatment absorbs the sound and localizes the noise so that it does not spread to other areas.—Business Wk, Oct 20, p56

New Twisted Filter Fabrics

Latest development in filter-fabric construction is more twist. Conventional fabric has one-half turn per inch of length. The new fabrics, made by Equipment Development Co., have 25 turns per inch.

The highly twisted yarns do not pack together tightly, except at binding points. Definite apertures exist between strands. This construction reduces loading with solids, precipitation of solids in and on the yarn surface, and problems presented by action of fungi, algae, and bacteria. Flow rate is greater, cloth life is longer.

The new filter fabrics are made in 20 different constructions of nylon, Orlon, Vinyon, Dacron, and Saran.—Chem Eng, Oct, p176



EVENNESS TESTER at work in the spinning room helps mill men . . .

Reduce Fiber Unevenness

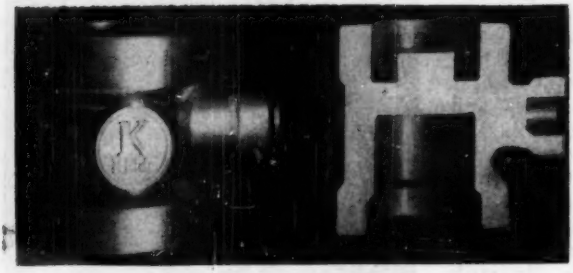
Pacific Mills' evenness tester produces a graph that shows variation in any continuous, fiberous material. Interpretation of the graph tells mill men the weight of material, average percentage of variation, percentage of maximum deviation from the average mean weight, and the average amount that the material is heavier or lighter than the desired weight.

Here is how the tester works: Material being tested is fed into the nip of a pair of tongue-and-groove rolls. The top roll (tongue) moves in a vertical plane to accommodate the thickness of the material.

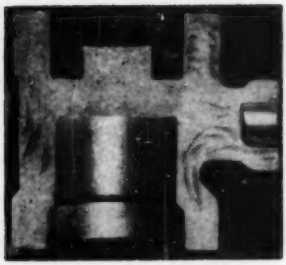
Any variation in the thickness of the material will cause the top roll to move up or down as the stock passes through the nip. This movement is converted into an electrical impulse that in turn is inked on graph paper by a photoelectric recorder. A suitable combination of creel and tensioning devices is provided to accommodate all types of packages.

Moisture content or oil in the stock has no effect on the results. The tester's sensitivity enables it to pick up a ½-in. change in roll setting.—Textile World, Oct, p138

Cored Forgings Cut Production Costs



Brass forgings cored without draft show weight reductions to 50% and need less machining than solid forgings. This Kidde discharge head is forged in mechanical press with split dies and movable cores. Only one press stroke is needed to forge piece.



Flow lines of head follow die contours and those of coring punches. Coring is from three sides of head.—Am Mach, Oct 1, p140

Radioactive Isotopes Help Cure Oil Wells

Acid pumped into an oil well dissolves limestone particles that have clogged the pores of the oil-bearing shale and thus cut off the flow. But it is wasteful to pour acid on the non-productive parts of the well shaft. The problem is: how to confine the acid to the productive parts and how to find the proper acid level deep in the earth?

Radioactive Products, Inc., has come up with a solution. Radioactive isotopes and a Geiger counter do the trick.

A 2-in. tube is dropped to the bottom of the oil-well shaft. A Geiger counter is lowered down the tube to the pay level. Then the acid, containing radioactive isotopes, is poured down the tube. When the level of the acid reaches the counter, it signals the operators.

A pump is started; its pressure forces the acid against the shaft walls and thus clears the pores. By synchronizing this pump and the pump used to introduce the acid in the well, the acid can be held at the desired level.

After the acid completes its job, the counter does another chore. It is lowered slowly all the way to the bottom. Its alternate clickings and silences indicate at just what levels the acid has done its work—Business Wk, Sept 29, p69

Do They Stop Tooth Decay?

New types of tooth pastes and powders have flooded the market in the U. S. Ammoniated tooth powders, which surged into popularity in 1949, have been followed by dentrifices containing penicillin, chlorophyll, and sodium undecylenate.

Andrew Jergens and Bristol-Myers make powders with penicillin and claim that they reduce tooth decay. Present chlorophyll dentrifices are Pepsodent's Chlorodent and Rystan Co.'s Chloresium.

Unusual anti-decay material is sodium undecylenate—the active ingredient in Cly-dent, which is made by Skin Tested Drug Products. The maker claims that research indicates its superiority to ammoniated products.—Chem Wk, Sept 8, p33

New Chemical Products Meet Industrial Needs

American chemical industry is booming with new products. Here are a few:

• Antioxidant for organic materials, such as rubber, mineral oils, other oils, and paints, is Ionol. Made by Shell Chemical Corp., this new chemical is a trisubstituted sterically hindered phenol —2,6-ditertbutyl 4-methyl phenol. It is a relatively colorless crystalline product that resists color and odor changes in treated products. Small quantities are effective.—p196

• New pigment threatens red-lead's long supremacy as a primer for coating steel surfaces. Compared to red lead, only half as much is needed to get equal hiding power. It uses only two-thirds as much lead and may be mixed with extenders up to 50% without losing inhibition properties. The new pigment, developed by Chemical Research Associates, requires no top coat, which red lead must have.—p197

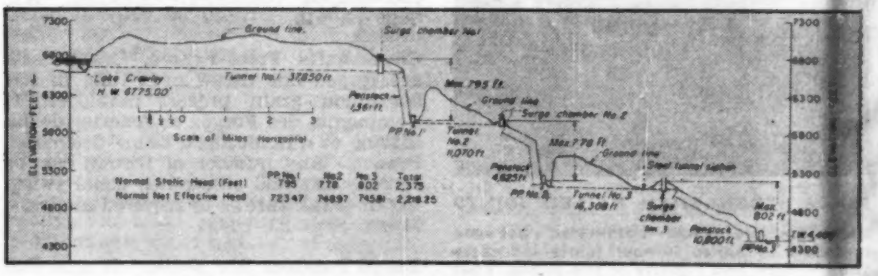
• Phenolic foam core material with compressive strength up to 500 psi. is offered by Rezolin, Inc. Corfoam, as it is called, has good adhesion to wood, paper, most plastics.—p198

• Non-toxic liner for steel containers resists chemical attack and mechanical shock. It is an Epoxy resin and should impart no toxic character to foods, Manufacturer is Synthetasine Protective Coatings, Inc.—Chem Eng, Oct, p200

Does Microwave Pay?

Whether a microwave communication system can pay for itself depends on the industry and operating conditions. For pipeline installations, conditions should be such that, from a purely financial view, three or more private full-time talking circuits plus one or more telemetering or supervisory control circuits are required.

Other considerations, such as service continuity and a need for a company to control fully its own communication facilities, may over-ride the financial considerations. Future operation will probably see telemetering and supervisory control become more important than the voice circuits.—Oil & Gas J, Oct 4, p216



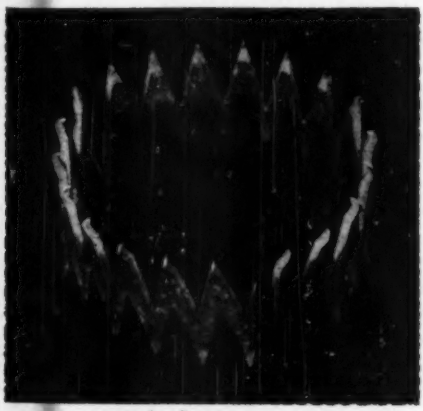
POWER PLANTS OPERATE WITH EQUAL HEADS

Three hydro power plants on Owens River Gorge in California are located in series and operate with equal net effective heads. This arrangement allowed use of identical units and equipment throughout, requiring only one set of spares and also simplifying plant design. Fitting three plants with equal heads required radically different lengths of tunnels and penstocks because of nonuniform river drop. Further economies were made by outdoor construction and supervisory control of two plants from the third plant.—Elec World, Sept 24, p90

TECHNICAL SHORTS

Hang the Tanks—Huge, steel brewhouse tanks at San Francisco Brewing Co. were too heavy for the unstable, sinking ground. So the tanks were hung by special two-point suspension method with two steel straps running to building girders. Weight was thus distributed and foundation pressures were equalized. —Food Eng, Sept, p145

How To Machine Glass—New photosensitive opal glass is machined without tools at Corning Glass Works. Design is first printed on glass by photographic negative and ultraviolet light, then developed by heating for 2 hr. Immersion in hydrofluoric acid solution eats through printed areas, leaving the unexposed glass.—Chem Wk, Sept 29, p39



RINGS STRENGTHEN NAILED JOINTS

Steel toothed rings hammered between members of nailed lumber joints increases the strength and rigidity of the joints. That is what tests in the Wood Research Laboratory of Virginia Polytechnic Institute indicate. The steel-ring fasteners, 1 in. in dia. and 7/16 in. wide, have multiple prongs and are similar to the standard toothed-ring alligator connector. Nails were 3½ in. long and were either plain-shank or threaded-shank.—Eng News-Rec, Sept 27, p39

Gage Controls Paperboard—Milk-carton paperboard should be uniform in weight. So Fibreboard Products Corp. has installed a General Electric beta-ray gage on paperboard machine to measure and record deviations from desired weight; operator can then make corrective adjustments.—Elec C&M, Oct, p124

Aluminum Polish—Ryan Aeronautical Co. has developed a new polish for aluminum-alloy aircraft parts. It does not thin out the aluminum clad. It contains 4 lb. of 400-mesh silica to the gal. of water solution and is applied by cloth.—Am Mach, Sept 17, p113

Propellers Rubber Filled — Hamilton Standard hollow propeller blades are filled with Hycar sponge rubber. Sponge keeps blade shell from vibrating and supports it against impact of rocks, ice, other materials.—Prod Eng, Sept, p197

Free-fall Aerial Deliveries—General Tire & Rubber Co. has developed a liquid container, made of synthetic rubber, that bounces when it hits. Size tested holds 5 gal., has been dropped from 2,000 ft. for a free fall without damage to the disk-shaped container. — Aviation Wk, Sept 10, p10

Crankshafts Press-Forged—Crankshafts are forged one throw at a time in RR continuous-grain process developed at Compagnie des Forges et Acieries de La Marine et d'Homecourt, Saint-Chamond, France. Any number of throws can be forged. Method eliminates usual twisting of crank throws to required angles.—Mach, Sept 22, p1421

Boxed Potatoes Are Better—Oregon Potato Commission study indicates that physical damage in shipping can be greatly cut by use of 50-lb. corrugated containers. A 275-lb. test carton proved strong enough but a 200-lb. test, impregnated-board carton is expected to provide necessary rigidity and proof against moisture.—Mod Packaging, Sept, p112

Floats Steel Tank Into Place—Rockland Light & Power Co. wanted to move a 5½-million gal. steel tank 200 ft. to a new location. So they enclosed old and new locations in one big leevee and then flooded the area. When the tank floated, it was a simple matter to hand-winch it into the new location.—Const Meth & Equip, Sept, p56

Deflocculates Ceramics—Lignin recovered from kraft black liquor in paper mills has been used in ceramic deflocculation in typical semivitreous and hard porcelain casting bodies. It gives greater fluidity with less sodium than is required with an inorganic deflocculant.—Paper Ind, Aug, p545

Safer Welding—When an oil tanker needs a welded repair, it can be made safely by first inerting the tank with carbon dioxide. Excellent way to do the job is by evaporizing CO_2 liquid to gas in a steam-heated heat exchanger.—Weld Eng, Sept, p56

Nylon Encases Thermistors—Extruded nylon tubing of about pencil diameter is pressed flat at both ends after thermistor is inserted. Tubing, made by Anchor Plastics Co., protects and insulates glass bulb.—Electronics, Oct, p212

New Use for Perlite—Expanded non-metallic additive for oil-drilling muds prevents loss of circulation and drilling mud. Great Lakes Carbon Co. calls the perlite product "Strata-Seal."—Eng & Min J, Oct, p102

First U. S. Mine Diesel—U. S. Bureau of Mines has approved the first diesel locomotive for underground use. Three years were needed to develop the locomotive and make certain that all safety requirements were met.—Coal Age, Oct, p98

Filter Cuts Oil Costs—Hydraulic-press oil is usually good for only 6 months, then must be discarded. One company installed a $300 filter and over the following year spent $300 for oil instead of the former $1,000. Saving: $700 in just 1 year.—Ceramic Ind, Sept, p74

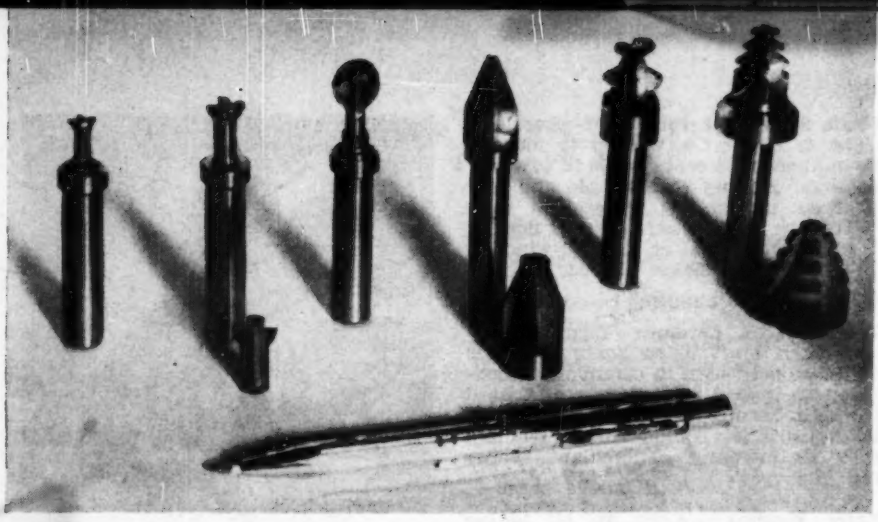
UP BUT NOT OVER . . .

. . . is the story as this oil-field truck tilts some 30° while a 14-ton load is pulled aboard by a winch. Built by Scammell Lorries, Ltd., for use in Borneo by Shell Oil, the truck has four-wheel drive and transverse front springs that allow travel over rough ground. Besides 50,000-lb. winch, truck also has "gin poles" that can be erected to serve as a crane.—Prod Eng, Oct, p200

Better Sulfate Process—Ammonium sulfate is produced by spraying 80 to 100% sulfuric acid into ammonia atmosphere. It is then cooled by spraying with liquid coolant—water, ammonia, toluene, butane—and kept solid and free-flowing. Socony-Vacuum Oil Co. developed process.—Chem Eng, Sept, p238

Plastics and Cement for Tunnel—Small amounts of water-soluble plastics added to concrete mix improved concrete for Dutch automobile tunnel. A plastering paste of cement, extenders, and a cellulose ether prevents tile from falling from ceiling.—Mod Plastics, Oct, p177

Controls Temperatures—An electronic scanning system developed by Minneapolis-Honeywell Regulator Co. controls up to 270 separate temperatures in a synthetic-fiber plant or steam-generating system. If any of the temperatures goes beyond a preset limit, the scanner warns the operator.—Business Wk, Oct 13, p59



***CARBIDE FORM CUTTERS** can be made at a reasonable price when the compact is preformed in partially sintered condition. Pencil in front indicates comparative sizes of cutters.*

Cut Costs of Carbide Cutters

New technique makes milling cutters cheaper, saves diamond wheels and grinding time, forms intricate shapes easier

CARBIDE TOOLS are expensive. But J & S Tool Co. has reduced the cost of carbide milling cutters by (1) cutting cost of the original carbide blank and (2) cutting machining time.

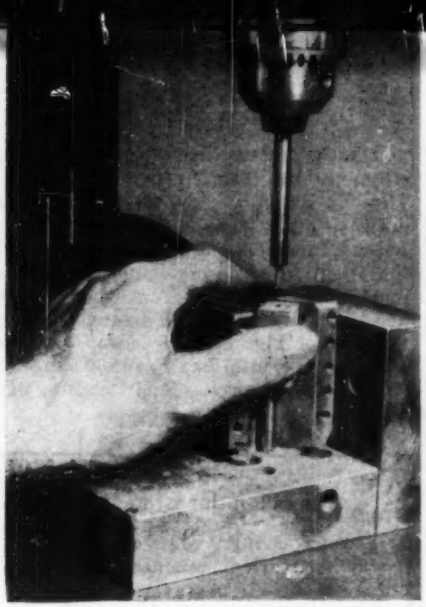
To reduce blank cost, the cutting head only is made of carbide and is brazed to a high-speed-steel shank. Also, a square shape instead of a round blank was found to reduce both blank size and the amount of material removed. Result: eight cutters from a blank originally needed for one cutter.

Machining time is cut by grinding the blank before it is fully sintered. The "green" compact is centered by a carbide center-drill (next page), then mounted in a special collet on a grinder. The collet permits sensitive adjustment of pressure.

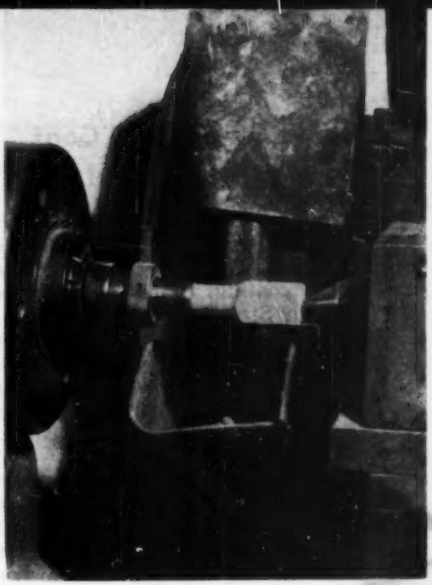
A straight Crystolon wheel rough-grinds the blank, and a formed wheel grinds tree or ball shape, as required. Flutes are next formed with a relatively coarse diamond wheel on a bench surface grinder. Speed is the highest possible, and feed is light. After flute forming, the cutter is returned to the carbide supplier for final sintering.

Next, the shank is ground to size, the cutter is brazed to the shank, and flutes are finish-ground. Each step is checked by a comparator. Final sizing is accomplished with a diamond wheel.

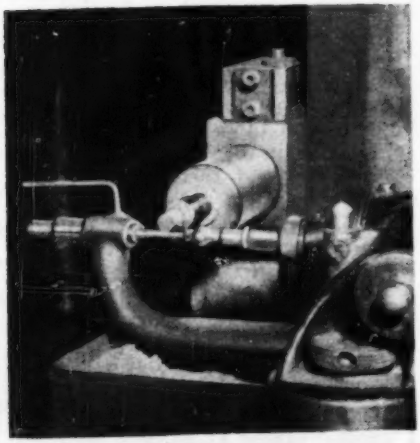
Final radius grinding is aided by a J & S two-angle-tangent-to-radius dresser used on a surface grinder. The dresser allows holding 80% of the ball diameters to —.00005 in. of maximum limit. Clearance on the primary land is held at 0.00001 in. to avoid tool chatter. Manufacturing cost is the same as for a high-speed steel cutter. —Am Mach, Oct, 1, p131



1 *CARBIDE BLANK is centered while held by hand against a V-block. Center-drill has carbide tip brazed into steel shank. Blank must be handled with care to avoid cracking and chipping. Blank size allows finishing.*



2 *ROUGH SHAPE is ground with coarse-grain wheel with the blank held in a special collet. The collet contains integral center concentric with fingers; knurled ring adjusts holding pressure for sensitive control of squeeze.*



3 *DIAMOND WHEEL forms cutter flutes. It must be relatively coarse or it will load and rub, thereby breaking the blank. Speed is high, feed is light. All preform grinding is done dry. After flute forming, cutter is sintered.*

4 *CONVERTED J & S DRESSER is final radius-grinding fixture and provides positive stops. Grinding with straight diamond wheel is done on surface grinder to high accuracy on dimensions and clearances. Step completes cutter.*

Process Enamels One Coat on Non-Premium Steel

One coat of white titanium enamel can now be applied directly to non-premium steel without the need for a ground coat. The coating, called Ti-Loc, was developed by Strong Mfg. Co.

Ti-Loc is claimed to have all the characteristics of commercial acceptable finishes, such as acid and abrasion resistance, high reflectivity, color stability. A coating as thin as 0.003 in. can be applied, as compared with two or three times this thickness in other methods. The thinner coating is less likely to chip.

Other advantages of the process are (1) its success with enamels in the lower firing ranges (where warping is less), (2) its lower cost putting porcelain enamel on a better competitive basis, and (3) its ability to withstand sawing, shearing, punching, and drilling.

Present uses include fluorescent light reflectors made for Westinghouse. Strong officials believe that Ti-Loc can be applied successfully to any product now being porcelain enameled without any major change in equipment.—Iron Age, Sept 27, p43

How To Cast Epoxies

A new series of epoxy or ethoxyline (McG-H Digest, Jan, p39) materials called Coil Seal 11 and Coil Seal 17 have been produced by National Engineering Products, Inc. Both are pourable liquids that may be cast at atmospheric pressure with no baking. Addition of a hardening resin provides reactivity.

Small parts may be cast in molds made of plastisol, rubber, methyl methacrylate, or plaster of paris. Shrinkage is small enough to permit use of large imbedded inserts. Resistance to dielectric stresses is unusually good.

One casting technique employs polyethylene film for "injection casting." The "injector" is a polyethylene bag with a glass tube spout. Epoxy is poured into the bag and squeezed out the spout into the mold aperture. The mold may be filled from the bottom at room temperature. This method permits injecting epoxies into complex apertures or into small sections around complicated inserts.—Mod Plastics, Oct, p94

Foreign Investments

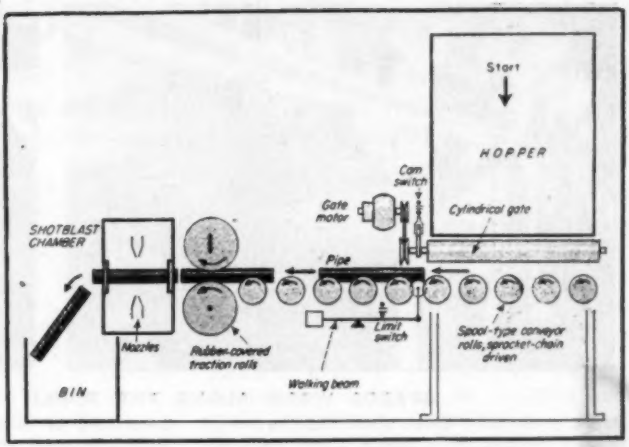
Is your country one of those in which American business firms are facing serious obstacles in making direct investments? Do you know what these obstacles are and how they are restricting the flow of capital to your country? Would you like to know what American businessmen say would encourage them to expand their foreign investments?

The answers have been sought out by the National Industrial Conference Board. Over 100 American firms with 1,097 branches and subsidiaries in 98 foreign countries have reported their troubles and where they face them.

The leading obstacles were found to be export and import quotas, limitation on remittance of profits, control of capital movements, burden of social security legislation, and lack of trained native personnel. The whole story is published in the technical paper, "Obstacles to Direct Foreign Investment," priced at $3.00 a copy by the National Industrial Conference Board, 247 Park Ave., New York 17, N. Y.

SHOTBLASTING MADE AUTOMATIC

Pipe is shotblasted at Westinghouse Electric Corp.'s Buffalo plant with no handling except loading of hopper with 5-hr. supply of 2-in. pipe in lengths of 6 to 32 in. Half-cylindrical gate rotates to deposit one pipe at a time onto spool-shaped conveyor rolls. Pipe is fed through shotblast chamber by traction rolls. — Am Mach, Sept 17, p160



How To Prevent Flush Fires in Hydraulic Power Systems

1. Shield piping from damage with raceways or conduit. The ideal system resembles a fully protected electrical power distribution system.

2. Use flexible hose sparingly. Enclose all flexible hose in a box or shroud that can be vented to the sump or waste pit. If possible, use telescoping joints or rotary joints.

3. Avoid loose, vibrating pipes. Vibration breaks the metal by work hardening. Copper is easily broken this way.

4. Avoid long overhead runs of pipe. Any failure will spray oil over a wide area.

5. Close system openings through floors or partitions with asbestos packing to prevent spread of leaks or flames.

6. Avoid shock in the operation of the machine. See that the oil flow is smooth. Hammering in the machine is a sign that the hydraulic system needs redesigning.

7. Use good workmanship in installation or repair. Do not strain pipes to fit them into position.

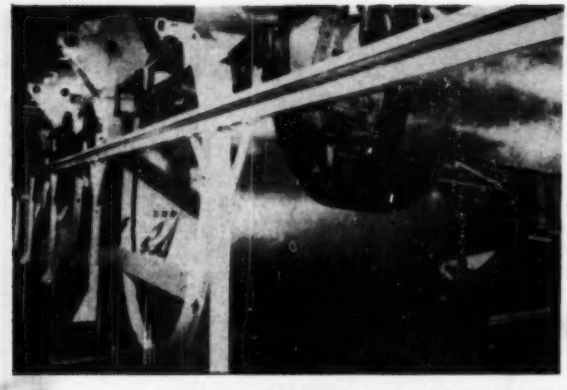
8. Guard against makeshift repairs. Prohibit temporary changes using malleable-iron fittings, or wrought-iron or welded pipes.—Factory, Sept, p138

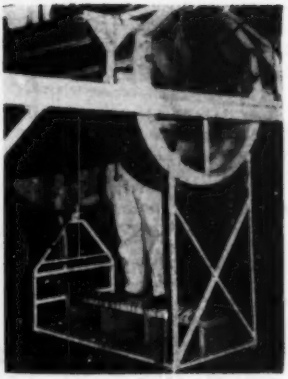
Prevents Crusher Plugging

To prevent expensive pileups and plugging of the crusher employed for breaking down mine-run at the Elkol tipple of the Kemmerer Coal Co., a governor-type feeder control was developed.

The feeder control was made from an airplane tachometer. The hands were removed and the flyballs were used to tilt a mercury switch hinged at one end. The cable driving the flyballs was fastened to the ends of the shaft of the motor driving the crusher. Critical speed is 130 rpm. If trouble occurs and the motor shaft drops to that speed, the free end of the mercury switch is tilted down to break the circuit and stop the feeder.

As the crusher clears itself and comes back to speed, the mercury switch is tilted up to horizontal position to complete the circuit and start the feeder.—Coal Age, Sept, p104





SPEEDS WORK ALONG THE RIGHT TRACK

More production speed and conservation of vitally needed floor space come from an elevated track arrangement to facilitate equipment installation in B-47 rear fuselage sections built by Texas Engineering and Mfg. Co. Temco engineers designed this production facility as a substitute for carrying each fuselage section in its own jig consisting of two scaffold-like stands attached to each end by support rings, then mounting the entire jig on wheels in order to facilitate movement on floor tracks. Scaffold stands have been eliminated. Wheels have been welded directly to the jig support rings. Platforms are suspended from rings.—Aviation Wk, Sept 10, p20

Central Dispatch System Speeds Materials Handling

Twenty-two fork lift and platform trucks move over 800 loads a day at Pratt & Whitney Aircraft. In 1948, the same trucks moved only 250 loads. A central dispatch system, which cost less to install than one additional fork truck, accounts for the increase in materials handling.

At first, 17 trucks were assigned definite departments. The other five trucks were "rovers". The rovers proved more productive. So why not make all trucks rovers? All that was needed was something to control their movements. That is where the central dispatch system came in.

The system consists of a central switchboard and 21 call stations strategically located throughout the plant. All truckers keep contact with the dispatcher at the switchboard. He tells them where to pick up loads and where to deliver them. A map in front of the dispatcher helps him keep track of the trucks. The system is flexible, but always under control.—Factory, Oct, p111

Pan-Packaged Enchiladas

New aluminum-foil food tray solved XLNT Spanish Foods Co.'s problem of distributing precooked beef and cheese enchiladas. The container is a rigid rectangular foil tray, 1 in. deep, with rounded corners. A heat-sealed printed cellophane overwrap displays the enchiladas.

Printed in red, at the top of the overwrap, is the line "Heat in this aluminum pan." The pan also may be used as a serving dish and is sturdy enough for re-use purposes.—Mod Packaging, Sept, p96

Oil-Well Drilling Advances

- ▶ Drilling mud—it has proved itself a field well worth studying
- ▶ Straight-hole drilling—a problem but new techniques can lick it
- ▶ Fast drilling—new world's record set at 2,575 ft. in 8-hr. day

METHODS in oil-well drilling are changing for the better. While no one development can be singled out and called revolutionary to the industry, significant improvements are being made gradually in several fields.

Drilling Mud—A new and complex science has evolved with the development of muds and mud engineering. Important changes have been in the use of different kinds of basic muds—lime-base, oil-emulsion, salt, oil-base and other muds.

Improved performance from addition of oil to muds is reported from all drilling areas. Such muds consist of small droplets of oil surrounded by a continuous phase of water-base muds. Emulsifying agents, such as shales, bentonites, and starches, are needed. Oil-emulsion muds have given increased drilling rate, longer bit life, improved bore-hole conditions.

Oil-base muds are relatively new. They prevent wetting of shales and other formations and water blocking of oil-producing zones. Straight oil mud consists of high-flash diesel oil, oxidized asphalt, and a soap formed in the mixture. Use may be the difference between a non-producing and a producing well. —p203

Straight-hole Drilling—Studies of this subject by committees of the American Petroleum Institute have led to several different techniques. The techniques generally try to prevent drift of bore hole.

One method is use of oversize drill collars. This procedure involves risk of dropping a collar and nearly impossible recovery by fishing. Another disadvantage stems from cavings from hole sides.

A second method determines critical values of bit weight at which the drill string will begin to buckle. Stabilizers (collars) are then placed in the string at this point.

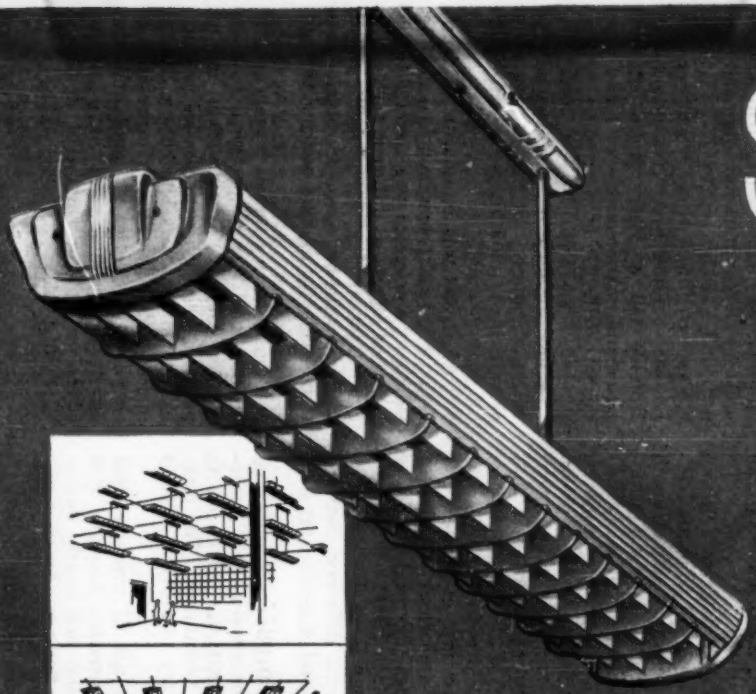
The percussion bit also permits straight drilling. Percussion feature allows use of lighter bit weights and still maintains penetration rate. Another bit introduced to drill straight holes is a combination diamond core drill and rock bit.—p208

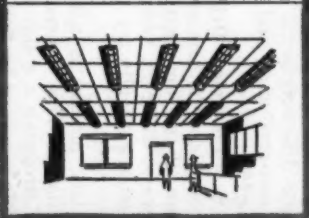
Fast Drilling—New world's record for fast drilling was recently set by a Humble Oil & Refining Co. crew in Louisiana. An average of 322 ft. per hr. was drilled in an 8-hr. shift, making a total of 2,575 ft. of 9¾-in. hole.

A jet-type drag bit was used all day without change. In fact, the evening crew drilled 1,260 ft. more before the bit was changed.

This record was one result of Humble's extensive research on fast drilling. Company's program was directed to isolation of effects of different factors, including circulating rate of drilling mud, weight on the bit, speed of rotation, and nozzle velocity of mud passing through bit.

Significant discoveries were (1) that drilling rate was proportional to these factors and (2) their effect on bit performance. This success led to Humble's turning to rock-bit drilling. Studies in this field have shown importance of chemical properties of mud and that different types of muds have varying effect on drilling rate.—Oil & Gas J, Sept 20, p216





STYRON

solves another production problem!

The manufacturer of this fluorescent lighting fixture chose Styron (Dow polystyrene) for his product. A material was needed that would permit a much larger installation than would be possible with heavier materials. Styron, light in weight but with excellent dimensional stability, filled this requirement.

Styron brought other outstanding advantages. Its special white colors provided good light transmission and diffusion. Its ease of moldability allowed the manufacturer to mold large portions of the assembly in one piece, reducing costly assembling operations.

This outstanding thermoplastic used for applications from wall tiles to radios may be the right material to cut costs and improve the appearance of your product. Contact your nearest sales representative or write Dow direct for more details about Styron.

Fill your chemical requirements from these DOW products!

alkalies

Dow alkalies serve many varied industries. Caustic soda is used to manufacture soaps, synthetic detergents and cleaning compounds; in refining vegetable oils; in manufacturing rayon and other textiles, paper and petroleum products and in chemical processing. Other Dow chemicals of alkaline nature include caustic potash and Sodium Orthosilicate Cleaning Compound.

dowicide® products

Today, materials in process can be guarded against attacks of mold and bacteria by the use of Dowicide industrial germicides and fungicides. These preservatives protect materials against microorganism attacks in processing paper, textiles, leather, lumber, adhesives, petroleum and disinfectants.

agricultural chemicals

A recognized leader in agricultural chemicals, Dow manufactures both basic ingredients and finished products that help farmers raise more and better crops and livestock. The Dow line includes such products as: weed and grass killers, insecticides, fungicides, soil and grain fumigants, plant growth regulators, veterinary chemicals and wood preservatives.

glycols

These versatile Dow chemicals are in great demand in many industries. Here are a few of the jobs they are now doing: a moistening agent in foods and tobacco; a plasticizer for films; a freezing point depressant in automotive and industrial antifreezes; a solvent and carrier in printing inks; a coupling agent in textile soaps, as well as in various cosmetic preparations.

There's a Dow Sales representative near you. Contact him for information about these products and more than 600 other chemicals which Dow supplies to industry or write to Dept. EX-19.

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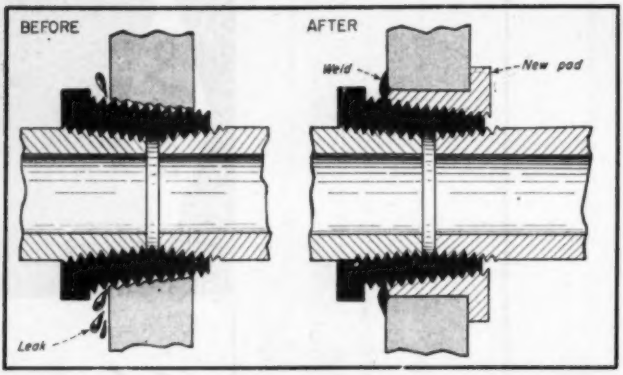


HOW TO FIX LEAKY THREADS

Threads on boiler feed-line bushing leaked, even after retapping of 9/16-in. thick head for the 2-in. steel bushing. Welding in new collar made from regular blow-off pad and tapping it with full threads stopped the leaking entirely. — Power, Oct, p109

New Homogenizer Cuts Costs

Instead of a conventional homogenizer, Jefferson Mills, Inc., operates a Scott & Williams Hydropulse homogenizer. A piston and a rubber pulsator in the new unit alternately create vacuum and pressure to operate ball-type valves. This action breaks down the starch granules. The unit can operate dry without damage, and the entire mechanism is separated from the size.

Two elements make up the Hydropulse: (1) the heat exchanger in which the cold slurry mix is heated to 184° ±2° F. and converted to a starch paste, or sludge; (2) the high-pressure homogenizer that continuously converts this heated starch paste into a useable size.

Less steam is required and no dilution of size mix by condensate occurs. Sizing materials are saved. Better warps have resulted from the use of freshly prepared size.—Textile World, Oct, p123

Detects Gun-Barrel Cracks

Gun barrels (and other ferro-magnetic tubes) must be checked for cracks. In one method, the barrel is magnetized in a circular manner by passing a current through the tube bore.

The resulting circular magnetic field is distorted by any magnetic variation in the tube; the flaw therefore can be detected by a search coil passed close to the inner surface of the tube at a uniform speed.

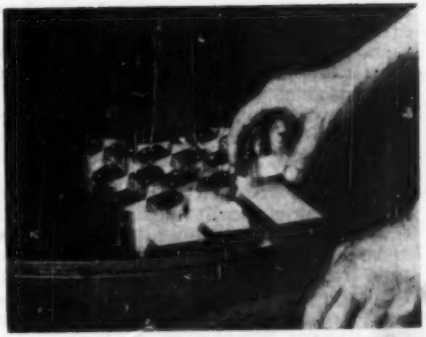
The coil is a magnetic pickup head that rotates around a crawler. Its signal is amplified and fed to a recorder consisting of two electrodes. Electrosensitive paper passes between the electrodes, and movements of crawler and recorder are synchronized so that each point on the paper record represents a point on the tube bore. Cracks are immediately located.—Electronics, Sept, p92.

Mills Combustion Chamber

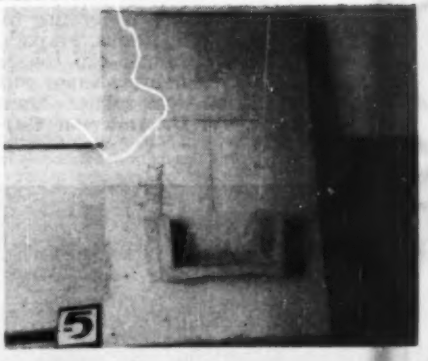
New Chrysler Firepower 180-hp. V-8 engine has spherical combustion chamber (McG-H Digest, Apr, p25). Spherical recesses are machined two at a time by two-spindle Cincinnati spherical milling machine.

Milling heads act like a toy top that is about to run down, thus giving the carbide cutting bits a spherical motion. This action is obtained by moving the cutter spindle in a cone-like path. Four bits in the cutter head sweep the surface desired.—Am Mach, Sept 17, p154

This Month's How To . . .



. . . **make pressure-sensitive tape** do an unusual job was shown by Pesco Products Div., Borg-Warner Corp. The tape used here has adhesive on both sides. Strips of tape are pressed onto the face plate of a surface grinder and nonferrous parts are stuck to the exposed face. The tape holds the parts firm and true during grinding. Pesco Products finds tape does hold for short runs and experimental work. It eliminated expensive holding fixtures previously needed for grinding small parts. —Factory, Oct, p91



. . . **test paint** is answered by a new test panel that (1) specifies improved paint systems within a year, (2) performs screening and elimination functions, (3) cuts time for panel testing by 50 to 75%. The new panel includes sharp and rounded edges, projections, rough wells, pits, crevices. Surface irregularities are those commonly found in regular use. Paint failure on panel accurately reflects failure in actual use. Correct paint and painting procedures will cut high maintenance costs. Panel was developed by Kenneth Taylor Associates.—Chem Eng, p140

. . . **smooth welded seams** is demonstrated by special rolling machine designed and built by Ryan Aeronautical Co. Seams are on stainless-steel exhaust sections, which are large tubular parts inert-arc welded into circular form. Former method was to weld with filler metal and hand-grind seams smooth. Parts are now welded without adding filler metal and then drawn between two steel rollers to flatten seams and improve weld quality by refining grain structure. Rolling is ten times faster.—Weld Eng, Oct, p70

NEW EQUIPMENT...

Hydraulic Dragshovel—Completely hydraulic truck-mounted dragshovel features fraction-of-an-inch control. Data show that boom telescoping feature has made savings up to 40% in time taken to move up or relocate for a better position.—**Bucyrus-Erie Co.**—Eng News-Rec, Sept 13, p140

Tractor for Narrow Aisles—Motorized tractor automatically engages industrial trailers and permits operation in narrow aisles. It can grab the end of a caster-type trailer and make a right-angle turn with the fixed axle of the trailer as the center of the turn.—**Yale & Towne Mfg. Co.**—Textile World, Oct, p176

Purifies Vapors—Purifier is for use inside steam drums, flash tanks, evaporators, packed towers, bubble-cap towers, deodorizers, stills. It delivers vapor with 1.0 ppm. or less of total solids. Many sizes are made.—**V. D. Anderson Co.**—Power, Oct, p160

TAKES BENDS OUT OF BARS

Straightening bars and tubes is easy with a Sutton Engineering Co. "KTC" Straightener. The device has seven rolls placed in such a way that no guides are needed to feed the bars through the straightener. Rolls hold the bars in place while they are run through. An automatic roll angling device allows changing rapidly from one size tube to another.—Business Wk, Sept 8, p62

Light for Photocopyer — Engineering drawings and other large originals can be photocopied easier with the Vacuum Seal Portagraph. This contact printer has single set of white lamps that provide all degrees of light intensity required. Model sizes are 30x42-in. and 42x60-in. copy area.—**Remington Rand, Inc.**—Am Mach, Sept 3, p195

Metal Finder—Guardsmen metal-detection equipment inspects meat, baked goods, candy, plastics, rubber, textiles, and other nonmetallic substances for tramp metal particles. Heads vary, depending on job. Power needed is 115v., 50 or 60 c., 70w.—**Radio Corp. of America**—Electronics, Sept, p144

Heats, Cools Pastes—Device consisting of two or more intermeshing conveyor screws rotating in a trough heats or cools pastes, sludges, solids. Heat-transfer agent circulates through flights and and shafts of the screws.—**Western Precipitation.**—Chem Eng, Oct, p182

Combination Heater-light — Fan-forced heater and overhead light unit is offered for bathrooms, cottages, farm uses. Heater delivers 5,000 Btu., while prismatic lens over 100-w. bulb diffuses light over entire room.—**Nutone, Inc.**—Elec Merch, Sept, p180

Low-range Tester—Cloth, paper, springs, ceramics, adhesives, wire, leather, other materials under 300-lb. limit can be tested in tension, compression, or shear. Pendulum-operated, dial-recording instrument reads in oz., tenths lb., and kilos.—**W. C. Dillon & Co., Inc.**—Prod Eng, Oct, p214

Portable Oil Purifier—Reclaimer is a compact oil reconditioning unit on wheels. It is designed for periodic purification of hydraulic oils on the job. Suspended solids, oxidation products, and water are removed from mineral or synthetic oils.—**Hilliard Corp.**—Factory, Oct, p172

. . . AND MATERIALS

Flat-top Conveyor—FlexTop conveyor, designed for tip-free conveying of bottles, jars, other packages, can flex in two planes and curve around corners of 6-in. radius. No transfer points are needed in the system; containers can readily move from top crescent-shaped plates of one conveyor to those of another conveyor.—**Chain Belt Co.**—Food Eng, Oct, p123

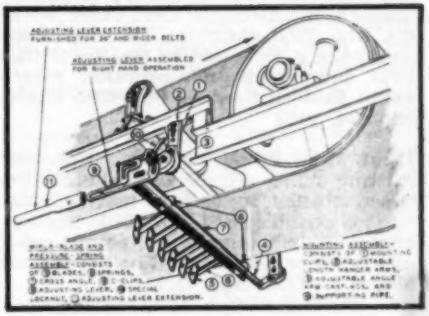
Plates Small Parts—Mercil portable plating unit has Plexiglas cylinder either 6 in. in dia. by 12 in. long or 8 by 18 in. Drive is 1/15-hp. motor. Tank will handle either acid or alkaline solution.—**Hanson-Van Winkel-Munning Co.**—Iron Age, Sept 13, p181

Diesel Electric Plant—Air-cooled diesel engine drives 3,000-w. generator for 115 v., 60-c., single-phase current. Features: push-switch control for electric cranking, manual compression release, and electric glow plug for cold-weather starting.—**D. W. Onan & Sons**—Elec World, Oct 8, p175

Processing Pump — Pedestal-mounted pump handles chemicals, liquors, corrosive materials, hot liquids, petroleum. Liquid end is self-contained unit. Pump is available in stainless steel, monel, nickel, other special metals.—**Allis-Chalmers Mfg. Co.**—Oil & Gas J, Sept 27, p122

Substitutes for Metal Coatings—Metallic acetate, for displays and metal signs, can be laminated to heavy board. Signs can be silk screened or reproduced with other processes.—**Coating Products, Inc.**—Mod Packaging, Sept, p133

Airplane Cover Fabric—Airplane fabric, coated with a nylon-base compound, can serve as external covering for wings, nose, fuselage, and other surfaces. It is lightweight, has high tensile and tear strength, and can withstand temperatures from −80° to 200° F.—**Flexfirm Products**—Aviation Wk, Oct 15, p59



CLEANER ADAPTABLE TO BELTS

Spring-type conveyor-belt cleaner consists of self-aligning spring-steel wiper blades, perpendicular to the belt surface and diagonal to the belt travel, that wipe the belt clean and dry as it passes. Spring arms supporting the blades maintain a uniform pressure on the belt and permit the blades to ride easily over obstructions. An independent mounting assembly simplifies adapting cleaner to fit existing conveyor installations. Stephens-Adamson Mfg. Co. manufactures the cleaner.—Coal Age, Sept, p114

Crawler-type Shuttle Car—Designed for operation in close quarters, new cable-reel crawler-type shuttle car has a turning radius of 14 to 16 ft. No clearance is required for turning wheels so a wider conveyor is built into body of car.—**General Electric Co.**—Eng & Min J, Oct, p113

More Pull for Tractors—Lug attachment gives farm tractors twice as much traction in mud. Lugs can be extended or retracted from the driver's seat. Each wheel attachment operates independently.—**Retractable Power Set Lug Co.**—Business Wk, Sept 15, p64

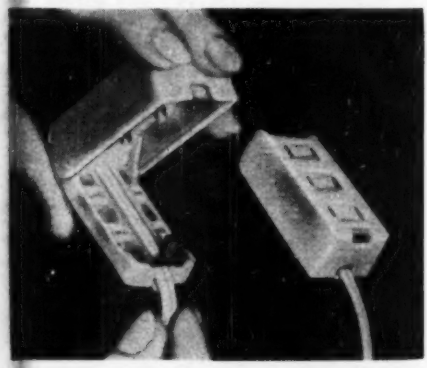
Lock Anti-freeze—Keyhole Anti-Freeze is oil-lanolin mixture applied to automobile door locks to prevent their freezing. Product also keeps parking meters working in cold weather.—**Elektrik Seal Laboratories**—Chem Wk, Sept 22, p37

NEW EQUIPMENT (Cont.)

Safety Rope—Se-Lectric manila rope has high electrical resistance to protect linemen, maintenance men, other workers who face electrical hazards. Rope resistance is increased by treatment that cuts down moisture-absorption rate.—**South Eastern Cordage Co.**—Elec World, Sept 24, p132

Light Mine Phone—Two-way talk over existing mine a-c. or d-c. circuits between stationary and/or moving stattions is possible with new 50-lb. Trolleyphone. Plugin components permit quick maintenance.—**Farmers Engineering & Mfg. Co.**—Coal Age, Oct, p120

Smaller, Lighter Respirator—New Comfo respirator has mineral-wood filter that needs less than half the filter area of older models. Smaller holders allow greater vision from all angles for the worker.—**Mine Safety Appliances Co.**—Ceramic Ind, Oct, p69



HANDY ELECTRICAL OUTLET

Triple electrical outlet molded of urea can be attached to wire without stripping or slitting the wire, and without use of tools. The outlet is opened by pushing aside the spring latch, and the wire is laid in a groove molded-in to the bottom half of the outlet. Metal prongs make necessary contact when the outlet is snapped closed. The unit is made by Academy Electrical Products Corp.—Mod Plastics, Oct, p109

Welds Thermoplastics—Pipe lines, tank liners, and chemical containers made of thermoplastic material can be made with two new welding guns. One is heated by gas, the other electrically. Inert gas or air passed through heating element and nozzle gives 300° to 700° F. temperature.—**American Agile Corp.**—Weld Eng, Oct, p63

Direct-flow Pumps—Chemical handling, forging-press service, steel-mill descaling, water injection in oil fields, and lean-oil pumping are jobs for these 6-in. stroke pumps. Power ranges from 300 to 900 hp. Pumps are built with 3, 5, 7 and 9 plungers.—**Aldrich Pump Co.**—Power, Oct, p158

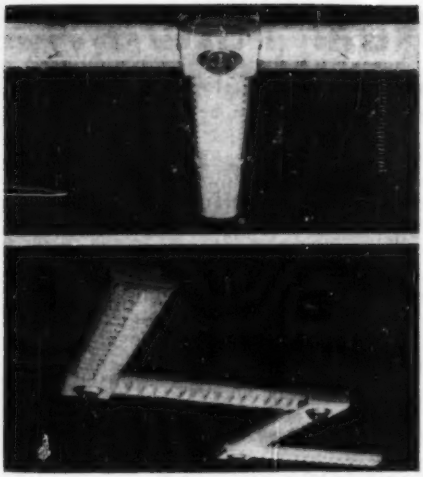
Derrick-digger Attachment—Any truck of ¾- to 1-ton capacity can accommodate this unit. Auger is lowered from winch line on derrick. When hole is drilled, auger is removed. Derrick then places pole.—**Tel-E-Lect Products, Inc.**—Cons Meth & Equipment, Sept, p112

Vibrating Conveyor—New conveyor vibrates at natural frequency of springs. Advantages: low power consumption, low maintenance costs, high capacity. It can move materials at 24 in. per sec. on flat hauls.—**Whitley-Carrier Co.**—Chem Eng, Sept, p180

Plates Bulky Parts—Barrel plating and processing machine, Super E, is entirely automatic. Barrels revolve continuously through whole cycle. Unit can be loaded manually or mechanically.—**Frederic B. Stevens, Inc.**—Iron Age, Oct 4, p371

Industrial Lighting—The 8-ft. Challenger fixture is designed for four 40-w., T-12, 48-in. fluorescent lamps. Made of heavy-gage steel finished in enamel, it comes wired for 110- to 125-v. ac.—**Curtis Lighting, Inc.**—Elec West, Sept, p50

Types on Metal—Typewriter is designed to make detailed markings on metal, such as for nameplates. All controls are electrical. Letter wheel is made of alloy tool steel.—**Cadillac Stamp Co.**—Am Mach, Oct 1, p195



FIXTURE ALLOWS FLEXIBLE DESIGN

Incandescent spotlight units are designed to match and give greater flexibility to Sylvania Electric Products, Inc.'s Trimline fluorescent lighting fixtures. Shown here are two architectural designs possible. Lighting fixtures can be formed to follow contours of an area and designed into square, rectangular, U-shaped, or other effective ceiling patterns. Units are particularly suitable for lighting drug stores, clothing stores, and other retail stores.—Pharm Intl, Oct, p39

Sub-zero Cooling—Vortex tubes without refrigerating mechanisms produce low temperatures from compressed air or other gas. Both heated and cooled fractions are given off. Uses include cooling small rectifiers, electron tubes, photomultipliers, other devices.—**Thermo Instruments Co.**—Prod Eng, Oct, p216

Fine-particle Mill—Compact mill reduces material to sub-micron particle sizes—as much as 100 times smaller than can be seen. Raw material of minus 4 mesh is injected into pressurized gas traveling at supersonic velocities and reduced by impact and abrasion between material particles.—**G. H. Wheeler Mfg. Co.**—Food Eng, Oct, p115

Lining for Canals—Irrigation canal liner made of asphalt reinforced with Fiberglas controls seepage and erosion in ditches, canals, stock ponds, and swimming pools. Liner is laid in over-excavated canal. Overlap is sealed with hot asphalt. Wire staples anchor lining. Canal liner is then covered with soil.—**Owens-Corning Fiberglas Corp.**—Business Wk, Oct 13, p60

Spot-welds ½-in. Al—Two thicknesses of ¼-in. aluminum can be welded on model PMCO. 6ST spot welder. Electrode force is adjustable to 23,000 lb., rating is 400 kva., peak short-circuit current is 225,000 amp.—**Sciaky Bros., Inc.**—Weld Eng, Sept, p62

Crane-hung Scale—Loads of paper rolls, baled pulp, rods, other materials in transit can be weighed on scale suspended from crane hook. Load is hooked to scale, and reading on 2-ft. dia. dial taken.—**Hydroway Scales, Inc.**—Paper Ind, Sept, p693

Truck Has Flat Rack Body—Odd-sized loads are easily handled on this power truck. Flat bed measures 44 by 60 in., carries up to 2,000 lb. Side fences can be used or removed to suit the job. Unit is powered by a 7.5-hp. gasoline engine.—**Whiteman Mfg. Co.**—Factory, Sept, p154

General-purpose Transformers — Dry-type transformers with class B insulation is for single-phase, 60-c. operation. New design gives 30% smaller transformers by use of improved core steels and more inorganic insulating materials. Line consists of 50 models, 3kva. and larger.—**General Electric Co.**—Elec C&M, Sept, p115

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Space Flight in Near Future

Scientists at London agree it is time to start turning theories into practice, and they also think it can be done fairly soon

WORLD'S CIVILIAN SCIENTISTS are taking the theory of space travel and applying it to schemes that seem capable of realization relatively soon—perhaps in the next 10 years. This trend is now defining astronautical aims within closer limits—near-to-earth satellite orbits for a beginning, and basically practical design thinking to promote early accomplishment.

Significant ideas on the establishment of earth satellites were presented at the recent Second International Congress of Astronautics, in London, sponsored by the British Interplanetary Society.

Here are some of the highlights covered at the Congress:

As an instrument carrier, an earth-satellite vehicle placed in a stable orbit outside the earth's atmosphere could perform a large number of functions. One of the first applications is likely to be a small instrument-carrying vehicle in a close orbit—at about 500-mi. altitude.

The possibility of putting a 484-lb. payload of instruments and telemetery equipment into such an orbit was discussed. It was concluded that it could be done with a three-step rocket using liquid oxygen and hydrazine and weighing 91 metric tons. The low over-all weight would be obtained by casting off the propellant tanks of the first step as they are used—before the complete step is jettisoned.

An orbital space-station, as techniques progress, will be required for research. Construction of this outer "platform" would require freight rockets capable of toting material.

A four-step rocket capable of carrying a load of 3.5 metric tons into an orbit at an altitude of 1,035 mi. was described. Propellant mixture would be nitric acid and hydrazine, assumed to have a specific thrust of 300 lb./lb./sec. The first two stages are intended to be recovered by parachute, the third discarded, and the last to remain in the orbit at an altitude of 1,035 mi. was fitted with wings for gliding back to a piloted landing on earth.

Greatest problem in the glider return technique from artificial satellites appears to be aerodynamic heating. An all-wing, delta-type glider using a double wedge section with the maximum thickness well back was proposed to overcome heating.

Such a configuration would require a low wing loading to keep maximum skin temperature within limits. Assuming a maximum allowable temperature of 1300° C., then a 5-ton payload could be glided down in a craft with a gross weight of 20 tons.

It was pointed out that as the high-temperature zone was localized it might be possible to raise the local allowable temperature by means of a ceramic insert. Even a small increase in temperature would have an appreciable effect on the maximum allowable size of glider.

Nuclear energy is still further in the future for space-ship propulsion but even here, artificial satellites may play an essential part. An economical method of using nuclear energy for such a project was advanced.

A ship moving from a satellite orbit around the earth to a satellite orbit around the moon or another planet would require only a small acceleration

and could therefore use a small thrust over a long period.

An electrically accelerated ion beam could achieve an ion ejection velocity of 62 mi. per sec., which would provide the needed thrust without high temperatures in the propellant gases. Gases obtained from planetary atmospheres could serve as the propellant. The consumption would be small; consequently, mass ratios could be low.

Civilian effort, it was said, not military would develop a satellite vehicle. Military propellants are unsuitable. Military needs differ from civilian.—Aviation Wk, Oct 22, p21

Air-Washing System Improves Knitting Quality

A central-station air-washing system automatically maintains humidity at desired limits at all times for the E-Z Mills knitting plant. Air within the knitting room is recirculated after washing and brought up to desired relative humidity and temperature. Additional fresh air is automatically drawn from the outside as needed.

For machine operation the system offers several advantages:

- Each knitting machine warms up much quicker.
- Fewer cloth defects, stoppages, and needle breakages result.
- There is less fly in the air. Now, fly tends to collect and settle on the floor.
- Cleaning time for machines is reduced.
- Yarn strength has increased and kinky yarn has been reduced.

Maintenance of the air system is simple. Screens in the washer are cleaned each day. Once each week the entire machine is washed down with a hose to remove lint.—Textile World, Oct, p124

GERMICIDAL-LAMP SIGN

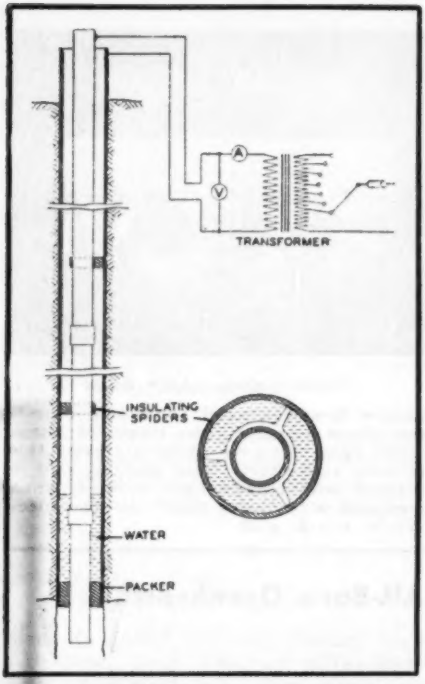
Special luminous paint containing chemicals tuned to same wave-length of ultraviolet light that kills bacteria creates this striking sign effect. New paint is said to respond with greater light intensity than produced with "black light" paints.—Elec-World, Oct 8, p162

All-Basic Openhearths

Four British and two Dutch all-basic openhearth furnaces have completed six campaigns. Conclusions reached indicate certain advantages: increased output, reduced man-hours for brick laying, less slag bulk, reduction in shutdown time, and best liquid-fuel use.

Observations show that bursting expansion resulting from absorption of iron oxide is the most serious source of roof failure. Possible ways to prevent this failure are use of chrome ores with higher Al_2O_3 and lower Cr_2O_3 contents, increasing the amount of matrix, alterations in grading and proportions of chrome ore, and increasing magnesite-chrome ore ratio.

Rich fuels, such as liquid fuel and coke-oven gas, are particularly suitable for all-basic furnaces. Reasons: high fuel-input rate and absence of burning-out periods. All-basic furnaces should be operated as fast furnaces.—Iron Age, Oct 4, p225



***ELECTRIC HEATER** prevents paraffin and asphalt from congealing by . . .*

Keeping Oil Wells Warm

New method, invented by Dr. Samuel Spitz of Los Angeles, sends low-voltage, high - amperage alternating current down the well to induce heat at points where paraffin or asphalt might congeal. Its purpose is to make the oil wells flow better by keeping the paraffin or asphalt in a liquid condition.

The heating medium is a column of water, about 10 ft. high, between tubing and casing. A tubing packer traps the water just below the point where the paraffin or asphalt comes out of solution. Neoprene spiders spaced 100 ft. apart insulate tubing from casing.

A 15-month test in Wyoming proved the system practical. Average power cost during the test was about 3¢ per bbl. of crude oil produced. Heating the well jumped daily production of crude oil from 32 bbl. to 105 bbl.—Oil & Gas J, Oct 4, p149

New Homogenizing System Banishes Weighing Chores

Batch weighing of salt, sugar, milk, and shortening in preparation of white bread doughs has been eliminated at First National Stores, Inc.'s bakery. But the bread is now of more uniform quality.

The bakery's present method is to dump materials (pre-weighed by suppliers) into pre-mix tanks, emulsify the mix with a homogenizer, and then meter the blend directly into the dough mixers. Before shortening is added to premix tanks, it is melted. Both shortening and water are metered into the tanks.

Besides eliminating tedious batch weighing, the system also does away with:

- Weighing errors by workmen.
- Need for cleaning receptacles into which dry ingredients are weighed.
- Loose control over inventory.
- Loss of ingredients that stuck to weighing buckets.
- Two of three men needed for weighing.—Food Eng, Oct, p67

Multi-Language Magazine

What is to be the world's first multilanguage magazine in the field of metalworking, the "International Journal of Metal Science", has just received financial backing from the American Society for Metals. Two top metalists from each of 22 nations will set publication policy. Present plans call for articles to be published in the language of the contributor. English abstracts will be given.—Weld Eng, Oct, p86

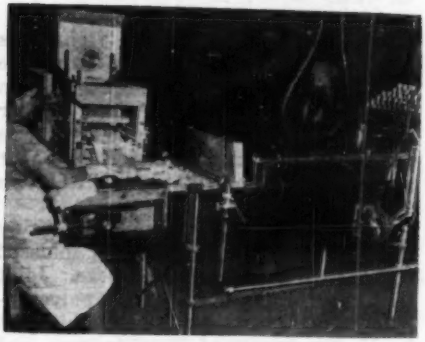
Aluminum Engine Powers Experimental Buick Cars

Buick's two cars of the future, Le Sabre and an aluminum-bodied convertible, are powered by the XP-300 engine. This engine, strictly experimental, weighs only 550 lb., yet is rated at 300 hp. and has developed 335 hp. in dynamometer tests.

Bore and stroke are 3.25 in., displacement is 215.7 cu. in., compression ratio is 10 to 1, and the engine is supercharged to 18.2-psi. manifold pressure at 5,000 rpm.

Engine height has been kept low by using a shallow oil pan and a relatively small flywheel and by dividing the crankcase in two sections. Lower section carries main bearings, water jackets, and cylinder sleeves; upper section has camshaft, valve lifters, and intake manifold.

The crankcase is cast aluminum alloy. Cylinder sleeves are "wet" type cast from Ni-Resist iron. The small flywheel is made of bronze to compensate for its low inertia. Cylinder heads, also aluminum, have fully machined combustion chambers.—Prod Eng, Oct, p196



INFRARED COOKS MEAT BALLS

Lower labor costs, less waste, more uniform browning of meat balls are major benefits of infrared broiling. At Nu-Trishus Products Corp., machine (left) forms flour-coated meat balls, which then are fed to conveyor leading to infrared broiler (right). Pipe over conveyor sprays grease on meat balls. Broiler is 20 ft. long, has Merco Heat Ray tubes, and can cook 9,000 lb. in 7 hr.—Food Eng, Oct, p91

Concrete Pumped 110 Ft. Up

Concrete was pumped from ground direct to forms for roof slabs of an 11-story building in Kansas City. S. Patti Construction Co. placed 17,000 cu. yd. of concrete for floors and columns with a double Rex Pumpcrete rig from one central plant setup. Maximum vertical lift of concrete was 1,100 ft. from pump to forms.

A 7-in. discharge line was used throughout the concrete distribution system. After a short run on the ground, the pipe became a riser up the outside of the building. A rubber hose inserted in the ground line dampened vibration from pump.

Air-entraining admixture helped keep the mix plastic. Cement grout pumped through the line at start of each pour lubricated the pipe.—Const Meth & Equip, Oct, p95

Electroplates Aluminum

New process for electroplating aluminum has been announced by U. S. National Bureau of Standards. Plating bath consists of an ethyl ether solution of aluminum chloride. The solution also contains lithium chloride or lithium aluminum hydride.

The bath is operated at room temperature and at current densities of 5 amp. per sq. cm. The aluminum is evidently caused to deposit by a complex of the hydride, aluminum chloride, and the ether because all three must be present.

Deposited aluminum has a smooth matte finish and a hardness of 37 to 97 Vickers. Deposits to $\frac{1}{8}$ in. thick can be applied.—Chem Eng, Oct, p110

Synthetic Rubber Improves Specialty Paper Properties

Adding synthetic rubber in latex form to paper may replace or augment the older method of coating or saturating paper after manufacture. Purpose is to improve wet strength, chemical resistance, elongation, burst strength, impact strength, scuff resistance, fold endurance, internal bond strength.

The method, developed by E. I. du Pont de Nemours & Co., utilizes the firm's Neoprene. Successful applications include paper rugs, disposal diapers, insulated bags, linoleum backing, industrial filter paper, gasket paper, multiwall-bag paper.

A newly developed Neoprene latex can be added to the paper without changing standard mill equipment or practice. Latex is added ahead of wire, usually at the beater or headbox.

Typical results: 2% Neoprene improved dry burst strength of kraft paper by 22%, wet burst by 650%; 70/30 mixture of southern and Swedish kraft with 5% latex had energy absorption increased from 9.18 to 12.95 and impact resistance from 8.97 to 10.33.—Paper Ind, Sept, p642

Roof Bolts Up Efficiency

A 50% increase in tons per man employed underground resulted from roof bolting instead of wood timbering at a Hutchinson Coal Co. coal mine. Roof bolting permitted mobile loading and rubber-tired haulage.

Roof-bolting equipment for each mine section includes one 210-cu. ft. per min. air compressor mounted on a crawler truck, two stopers, one impact wrench, and two dust collectors. A three-man crew drills and bolts fast enough to keep ahead of the loader.

When the compressor and equipment are in place, two men start drilling. The third man unloads equipment and readies the roof bolts. Wedges are inserted part way, plates are put on and the nuts screwed on far enough to leave ½ in. of the bolt end exposed.

Holes are drilled 44 in. deep. After the first hole is completed, the third man inserts a bolt and the stoper operator, after placing a driving dolly on the stoper, drives the bolt in to expand the upper end. The third man, using the impact wrench, tightens the bolt until the plate is deformed or the nut has quit turning.—Coal Age, Sept, p86

Polyethylene-Cable Splice Needs Care and Attention

Plant expansion at a Union Carbide & Carbon chemical plant meant greater underground distribution at various voltages up to 13,800 volts. Cable used was a polyethylene-insulated type with an outer jacket of Vinylite as a protector against abrasion.

Installing and splicing techniques had to be developed as little data were available. For splices, a 7½-in. length on each joining end was stripped, copper shielding tape was unwound, end was cut off to 3 in., and carbon black paper and 2 in. of polyethylene insulation were removed.

Ends were tapered, tinned by using stearine cake as a flux, and soldered together in a split copper sleeve. Joint was taped with non-adhesive polyethylene tape, then with copper shielding braid, two layers of Vinylite tape, and double layer of friction tape. Two coats of insulating compound were then painted over the splice.

Splices were started only in good weather to avoid getting moisture into the cable. Cable was tested with a 2500-v. insulation tester. An infinity reading was needed for approval.—Elec World, Aug 13, p130

Report to Management

Plastics Digest for 1951

- **Techniques in Engineering and Methods now brings you up to date on new ways to process and manufacture plastics. Begins on page 56.**
- **New Developments in Materials tells you what some of the new materials are who makes them, and where they are applied. Begins on page 59.**
- **Plastics in the Medical Field describes for you some of the new surgical and medical techniques possible because of plastics. Begins on page 62.**

FRONT COVER — Fifty-ounce styrene window is injection molded

***ACKNOWLEDGMENT:** The discussion of engineering and methods and developments in materials is digested from the 1951 Modern Plastic Encyclopedia and Engineers Handbook published by Plastics Catalogue Corp. Plastics in the Medical Field is digested from an article in the October Modern Plastics. No tear sheets will be available, but your editors are prepared to give you additional information on specific items.*

CONSTANTLY INCREASING in size, the plastics industry now takes a large slice out of finished- and raw-goods production. To help our readers keep abreast of developments in the plastics field, the McGraw-Hill DIGEST presents this report. It can help serve as a basis for evaluating proposals for future progress in plastics.

A series of ten pictures and captions deal with the latest techniques in engineering and methods. Covered are such phases as liquid impact blasting; electroforming to produce molds and spray masks; flash removal by a new high-speed method; dry coloring; annealing of styrene; producing polyethylene coatings by flame spraying; and how to manufacture and handle polyethylene monofilaments.

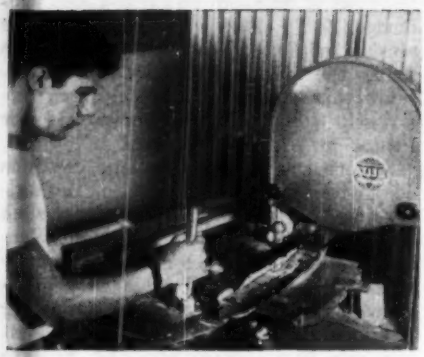
A second section summarizes the developments in materials. Here the information available has been reduced to include only the necessary data.

Medical research has found new and useful applications for plastics. Because the idea is relatively new and holds so much promise for the future, we have included plastics in medical treatment and surgery as a third section of this report to management.

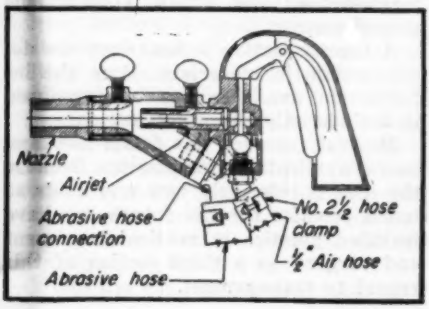
Techniques in Engineering and Methods

Latest procedures for manufacturing and processing plastic materials have special significance for the expanding industry

Fabricating Glass-mat Laminates—Rotary cutting of fibrous-glass-reinforced polyester laminates can be done with standard techniques and equipment. High speeds produce clean, smooth edges. Wet cutting allows greater speed with less power. Abrasive wheel cutting is faster than diamond or carbide blade cutting. Rigid work support and wheel mounting are essential when using an abrasive wheel. Sawing speeds are equivalent to those for phenolic laminates.

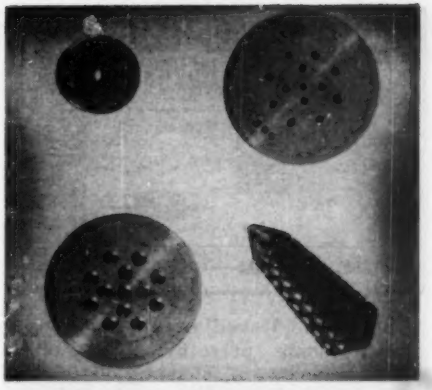


Band-saw cutting of glass-mat laminates requires a high blade speed (5,000-10,000 ft./min.) for smooth, accurate edges. Satisfactory edges can be obtained at ordinary saw speeds. Standard coarse-tooth metal-cutting blades are satisfactory. Wavy or raker tooth types are particularly recommended. Blade teeth will lose initial keen edge in first few inches of cut. The blade is no longer useful for metal cutting, but is satisfactory for glass laminate cutting. (See McG-H Digest, June, p34 for data on blanking and shearing glass laminates.)

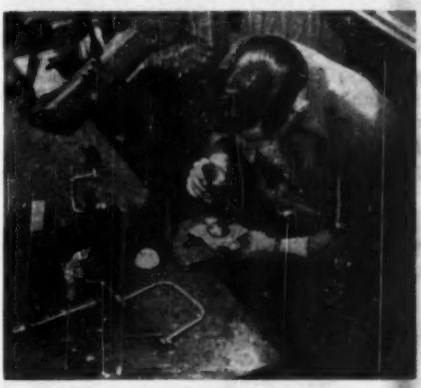


Liquid Impact Blasting—Abrasive suspended in water and agitated to maintain suspension is propelled by means of compressed air through blast gun shown. Toolroom uses are: (1) removing and blending grinding lines; (2) removing oxides and heat-treatment discolorations; (3) improving lubricant retention; (4) preparing surfaces for electroplating; and (5) fast mold maintenance. All mold parts should be finished to dimension, then blasted with fine abrasive to hold that dimension.

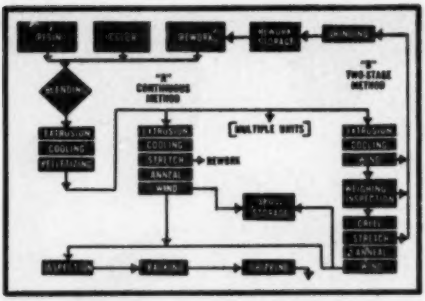
Dry Coloring—Simple method produces colored molding powder from colorant-blend virgin crystal styrene or recoloring scrap. Biggest advantage of the method is economy. Reworking scrap is another advantage of dry coloring. Reground scrap colors are blended and a dry color formulation is added to make the desired color. Types of colorants available are: oil-soluble dyes; pigments; mottles; fluorescents; phosphorescents; tinsel; and colored metallics. Proper die construction and mixing disks or nozzles are essential. Mixing plugs for dry color dispersion and distribution are shown.



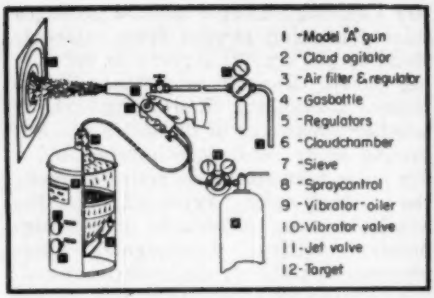
Spray Masks by Electroforming—Electroforming has been successful in making spray painting masks or stencils for selective coloring. In making a mask, blocking is built up first by using the molded part as a matrix. Blocking allows clearance between mask and the part to be sprayed. Wax or lacquer provides blocking. Then the matrix is made electrically conductive. The matrix is kept in a plating bath until a copper shell 0.050 in. thick is built up on the entire matrix surface. After the mask is polished, it is removed from the matrix and openings through which paint will be applied are cut as shown.



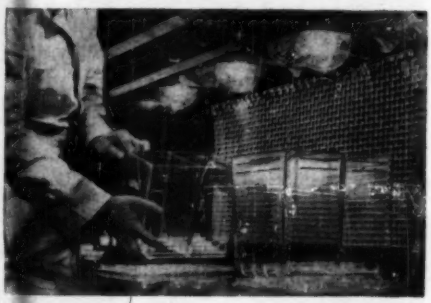
Molds by Electroplating—Molds for both injection and low-pressure molding are produced by electroforming (McG-H Digest, Oct, p56). Deep narrow cavities are easily built up in one piece on an accurate steel mandrel. Thin shell-like molds for slush molding are also being produced by electroforming. Electroformed cavities for injection molding are not strong enough to withstand injection pressures. Once the electroformed shell has been built up around the matrix, the outer surface is machined for a press fit into a steel suport. Deep-cavity molds by this process are cheap and easily made.



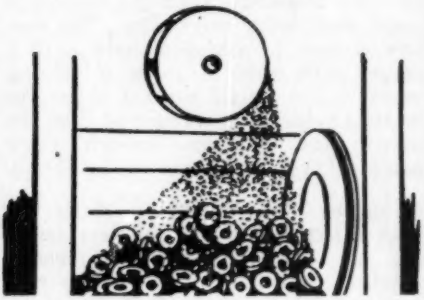
Polyethylene Monofilaments — Process for extruding polyethylene monofilaments consists of blending resin and colorant to obtain desired shade, compounding to put the resin into an extrudable form, and extruding into strands. Extruded filaments are cooled, stretched to increase tensile strength, annealed to obtain thermal stabilization, and wound onto spools. Materials processed are resin and colorants.



Flame Spraying Polyethlene — Polyethylene is insoluble at temperatures below 70° C. and cannot be dissolved and applied as a paint film. Also, stable emulsions do not give good results in producing coatings. Polyethylene has a sharp melting point, making flame spraying possible. Powdered polyethylene mixed with air and fuel is flame-sprayed on surface to be coated by using the equipment shown.

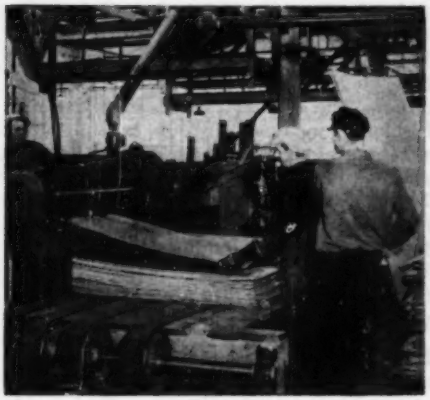


Annealing Molded Styrene—Cheapest method for relieving stresses in molded styrene parts is after-annealing. It is done by: (1) heating the part in a circulating air oven; (2) immersing it in a hot-water bath; or (3) subjecting it to infrared radiation. Dipping the part in a petroleum solvent will show the effect of different periods of exposure and degrees of temperature. Time and temperature are found experimentally.

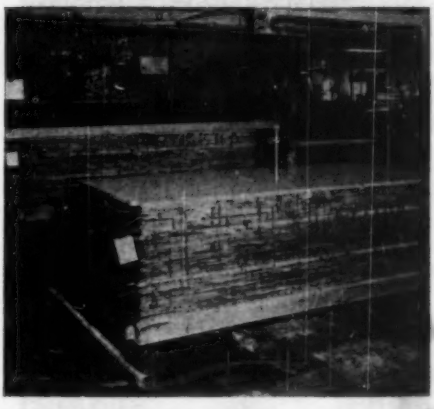


Automatic Flash Removal—There are many methods for removing flash and fins from thermoset molded parts. Latest proved method employs an endless conveyor for tumbling parts, thereby exposing all surfaces of every piece to a flash-removing blast. A rapidly-rotating bladed wheel hurls abrasive by controlled centrifugal force upon the work. Apricot pits crushed to 20-40 grit give best results.

Casein Adhesive Glues . . .



. . . Plywood in 15 Minutes



New Developments in Materials

Following details of some new and improved plastics show how they make better new products and make old products better

CHANGES in an acrylic molding powder (Rohm & Haas Co.) make it as easily handled for extrusion as for injection molding. Physical properties of the powder, a medium-heat-range material, are unchanged, but the improved formulation makes possible extrusions by standard techniques.

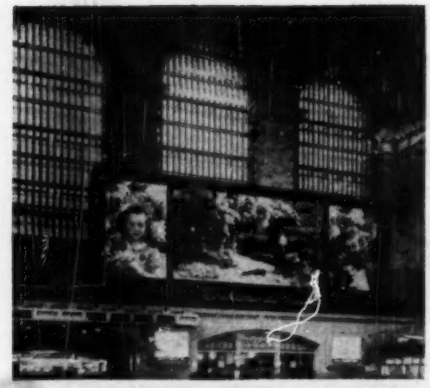
• A butadiene-acrylonitrile copolymer (Goodyear Tire & Rubber Co.) of the nitrile or oil-resistant type is offered as a latex in two degrees of stabilization; one is well stabilized, the other contains minimum stabilization for use where easy coagulation is desired.

These materials offer resistance to petroleum and animal oils and greases, alcohols, glycols, and aromatic and aliphatic solvents. Some application for these latices are in adhesives, specialty paints and sealers, leather finishes, and in the coating and impregnation of paper and fabric.

• Control-board-panel lighting system (Universal Aviation Corp.) makes use of an acrylic-vinyl laminate about 0.187 in. thick. This is one of the few known examples of successful lamination of acrylic and vinyl. The sandwich has a thick inner layer of acrylic that "pipes" light from concealed sources. The acrylic is first covered with white vinyl, which is covered, in turn, with black vinyl. The edges are sealed with the same black vinyl material.

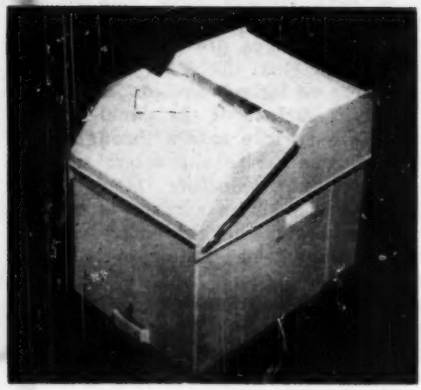
Letters or figures are processed into the black surface of the panel so that the white surface shows through, producing dead white characters against a dense, non-reflecting black background. The entire surface is smooth and flush, and the characters can be read at the widest possible angle. Suggested applications include aviation, automobile and marine instruments and control panels.

• For more on new developments in materials, see the next two pages.



Large sheets of acrylic plastic and improved handling techniques made possible the design and erection of a giant color transparency (Kodak Colorama, Plexiglas by Steiner Plastics Mfg. Co., Inc.) in New York's Grand Central Terminal. The display, 18 ft. high and 60 ft. long, is made up of two acrylic sheets; the front sheet is transparent and the rear sheet is white translucent. To make these sheets, sections measuring 60 by 102 by 3/16 in. were butt jointed with a modified "V" groove. Banks of fluorescent lamps behind the acrylic sheets illuminate the transparency.

Light-weight, durable mockups are made more efficiently by a new process using urea resin (Borden Co.) and cloth. The urea resin provides a good surface for finishing and gluing. The finished product is strong and water-resistant. Large mockups have previously been made of papier-mache, which is too weak, or plaster of paris, which is too heavy and difficult to handle. Type of cloth reinforcement depends on the strength desired in the mockup. The Freedom Bell, shown, is an example of mockups made with urea resin. Mockups provide engineers with an aid in visualizing finished product design.



Ethyl cellulose (Hercules Powder Co.) has replaced corrugated paper in an expendable radiosonde housing. The housing must be durable, light in weight, and weatherproof. Extensive compartmentation results in a complex design, and although walls must be thin, the housing must have good dimensional stability and must withstand exposure to a broad range of temperatures and humidities. Ethyl cellulose housing fills these requirements and weighs less than 10 oz. Ethyl cellulose also provides better sealing off of the transmitter and barometric unit from battery gases. Accuracy of readings has increased.

New Materials Briefs

Polyamide resin prepared by the condensation of dimerized vegetable oil acids with ethylendiamine are marketed as dispersions in water. Advantages over hot melt or solution type are: (1) higher solids content at low viscosities; (2) ease of application; (3) controlled penetration; (4) elimination of expensive and flammable solvents.—**General Mills, Inc.**

Aromatic petroleum plasticizer is now available. Material has better electrical properties and oil and water resistance than most plasticizers. It will not spew or migrate. Volatilization at high temperatures will not leave a sticky or otherwise marred surface.—**Socony Vacuum Oil Co., Inc.**

Baking-type coating intermediate is expected to form a versatile base for a whole new field of protective coatings. It combines chemical resistance with flexibility and heat resistance. Based on selected phenol derivatives, it is compatible with a variety of coating resins.—**General Electric Co.**

Externally lubricated polystyrene is now in full-scale production. Easier flow allows a 10 to 30% faster molding cycle, lower molding temperatures, and lower molding pressures. Low bulk factor results in greater utilization of rated cylinder capacity of the molding machine.—**Koppers Co., Inc.**

Moldable insulating material, a high polymer of monochlorotrifluoroethylene, hermetically seals terminals in electrical equipment. Material resists high operaperatures, low ambient temperatures, salt-water immersion, corrosive atmospheres, and other conditions.—**M. W. Kellogg Co.**

High arc resistance, excellent heat and flame resistance, and low dielectric loss are properties of new laminates made with continuous filaments of woven fibrous glass, plus silicone resin. Little loss in mechanical properties appears at 200° C.—**Continental-Diamond Co.**

Treated colorant line has been developed for dry coloring polystyrene, acetate, polyethylene, and methacryalte. Colorants are packaged in correct amounts to color 50 or 100 lb. of crystal, permitting dry coloring with a blender.—**Gering Products, Inc.**

Lignin-cellulose filler for phenolic molding powders and resinous adhesives is now available in a particle size of 100% through 100 mesh. It is competitive in properties and price with materials like walnut-shell flour.—**Quaker Oats Co.**

Polyethylene coated paper offers many advantages in commercial and military applications. Properties include chemical inertness, lightweight, toughness, tear strength, extensibility, flexibility at low temperatures, heat stability, and heat sealability. It can be colored by pigments and dyes and is easily formed or shaped by thermal means.—**St. Regis Paper Co.**

Hardeners for urea-formaldehyde resin glues are intended for hot press work. In liquid form, they have a fast curing cycle at 240° F. or above, but permit a long assembly time and give a long pot life to the resin mixture.—**Synvar Corp.**

New vinyl-coated fabric has fibrous cellulosic base. Wearing qualities and processing advantages make it especially suitable for low-cost luggage. It is also used in quarter linings for shoes.—**Textileather Corp.**

Phenolic adhesive sets at room temperature and may also be cured with high-frequency machines. It is not attacked by water, chemicals, bacteria, or fungi.—**Snyder Chemical Corp.**

Maleic anhydride is being produced in briquette form in commercial quantities. Absence of dust and fines, and small exposed surface per unit weight make the product suitable for plastics manufacture.—**Monsanto Chemical Co.**

Plastics in the Medical Field

New surgical and medical treatment techniques appear when plastics replace damaged or diseased portions of human body

MEDICAL RESEARCH in the past 5 years has uncovered many new applications of plastics that allow medical and surgical techniques not possible with other materials. Polyethylene, acrylic, some vinyls, and nylon are chemically inert and non-toxic; do not cause harmful reactions.

Polyethylene is successful in replacing the dura—the tough, fibrous membrane that envelops the brain. The injured or diseased dura is excised, and pure polyethylene film 0.002-in. thick is permanently implanted.

A thicker form of polyethylene covers skull defects. The plastic plate, 0.12-0.31 in. thick, is first cut to size. Contour is established by boiling the plate and bending to shape by hand. Dipping the plate in cold water fixes the contour.

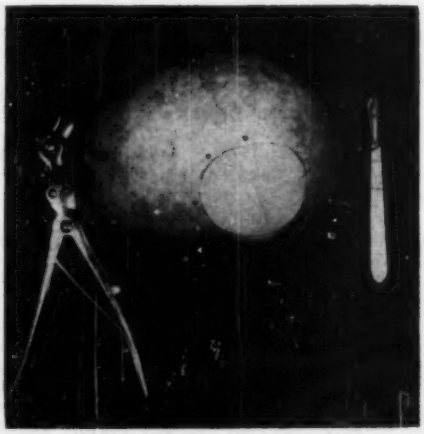
Pure polyethylene bags have been placed in the chest cavity to occupy the space left after the removal of one lung.

Acrylic is suitable as a replacement for blood vessels and heart valves. Its smooth surface can be highly polished and is resistant to wetting. Hence blood does not clot. Diseased segments of the aorta near the heart have also been replaced by a simple ball-check valve made of acrylic.

Nylon button-type closures plug holes that occasionally occur in the partition between the two upper chambers of the heart. Two nylon buttons can be threaded together with tissue held tightly between them.

These are a few outstanding plastics applications; others that have been developed and those yet to come will go a long way in helping medicine repair damage in human bodies.—Mod Plastics, Oct, p87

***POLYETHYLENE PLATE**, cut to size of skull opening, is molded to shape by hand.*



***AFTER SHAPING**, plate is shown in skull opening ready to be sutured in place.*

Design Considerations When Plastics Replace Metals

Now that metals are becoming scarcer, special attention is being given plastics as replacement for metals. To replace metals with plastics requires an intelligent interpretation of their properties. These features must be considered in mechanical design with plastics:

1. Low tensile strength. Exceptions are reinforced phenolics and polyesters.

2. Susceptibility to cold flow and creep at room temperature and under light loads.

3. Low modulus of elasticity. Increased section thickness is required.

4. High water absorption. A dimensional change, usually an increase, occurs and must be considered in design.

5. High coefficient of thermal expansion. It is generally large enough to be a factor in design.

6. Low heat resistance. Various heat-resistant fillers can make the thermosetting resins stand 400° F.

These features do not prevent use of plastics as metal replacements. But their consideration can prevent misuse.

Where aqueous corrosion resistance is a major requirement, plastics are usually superior to metals. For resistance to strong chemicals, a choice can be made among the plastics.—Prod Eng, Oct, p134

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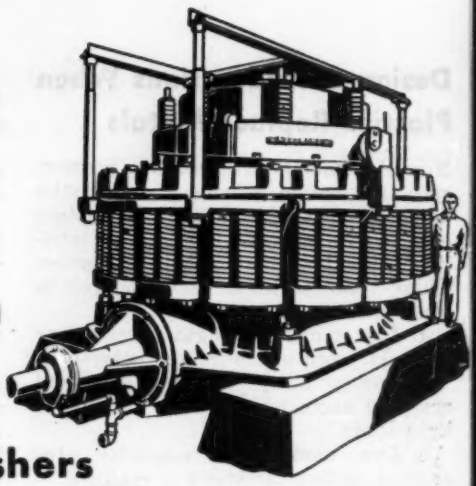

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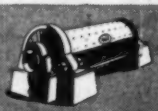

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PRODUCTION IDEAS

from Manufacturers' Catalogs

12-1 Electric Motors—Allis-Chalmers Mfg. Co. 16p. Three bulletins—05B7542A, 05B7648, and 05B7682—describe large squirrel-cage motors, synchronous motors of 100 hp. and larger, and totally enclosed motors.

12-2 Plastics Applications — Monsanto Chemical Co. 12p. "Idea Generators" shows by case histories how plastics have improved products.

12-3 Roller Chain—Atlas Chain & Mfg. Co. 29p. Catalog ARC-51 describes roller chain, selection, design, installation, maintenance, and lubrication.

12-4 Farm Sprayers—Food Machinery & Chemical Corp. 12 and 4 p. Bulletins L-724C and L-822A show construction features and uses of different types of sprayers.

12-5 Revolver Cranes in Action—American Hoist & Derrick Co. 20p. Catalog 400-R-3 is a picture story of cranes at work throughout the world.

12-6 A-c. and D-c. Motors—Wagner Electric Corp. 4p. Bulletin G50-1 covers repulsion-start induction motors, polyphase motors, and d-c. motors.

12-7 Industrial Truck Batteries—Gould-National Batteries, Inc. 22p. Data sheets GB-1293 and GB-1303 tell what batteries to use in 11 different makes of electric industrial hand trucks.

12-8 Precision Pumps—Pacific Pumps, Inc. 8p. Bulletins 105-A and 118 cover 40- to 7,000-gpm. centrifugal pumps and 450- and 1,000-gpm. steam turbopumps.

12-9 Fine Chemicals—Allied Chemical & Dye Corp. 4p. Leaflet lists the reagent, fine and special chemicals available for high-purity process use.

12-10 Basic Handling Facts—Clark Equipment Co. 24p. "Basic Facts about Materials Handling" shows clearly and simply how and why industrial trucks move goods fast and cheaply.

12-11 Air Conditioning — Westinghouse Electric International Co. 20p. How to plan for industrial air conditioning and the equipment needed are covered in bulletin B-5160.

12-12 Screw Machines—Cleveland Automatic Machine Co. 8p. "Model AB Dialmatic" bulletin covers features and performance of single-spindle bar and chucking machines.

12-13 Cryolite — Pennsalt International Corp. 24p. Booklet gives fairly complete information on physical and chemical properties and metallurgical, insecticidal, and other properties of cryolite.

12-14 Diesel Engines—Buda Co. 16p. In bulletin 1506 are given 12 reasons why Buda diesels will make money for you. It shows how too.

12-15 Grinding Machines — Landis Tool Co. 8p. Bulletins CH-51 and CI-51 describe 5x8-in. hydraulic piston grinder and 30-, 36-, and 48-in. universal grinder.

12-16 Aluminum Fastenings — H. M. Harper Co. 12p. Specifications are given on machine, carriage and lag bolts, nuts, capscrews, tapping screws, wood screws, machine screws, washers, rivets.

12-17 Carbide Gage Blocks—Pratt & Whitney Div., Niles-Bement-Pond Co. 8 p. Catalog shows how carbide gage blocks can give highly precise checking.

12-18 How To Spin Metal—Spincraft, Inc. 40p. Data Book No. 3 describes metal spinning, tools, design for spinning, and many typical applications.

12-19 Castor Oils—Baker Castor Oil Co. 4p. Catalog describes various types of castor oils and suggests uses.

12-20 Materials Handling—Yale & Towne Mfg. Co. 12p. Number 1 issue of Volume XV of "Off the Cuff" tells how industrial trucks can save you money in handling.

12-21 For Making Paper—Dorr Co. 12p. Continuous recausticizing system for alkaline pulping process is covered in bulletin 3304.

12-22 Feeders, Conveyors — Jeffrey Mfg. Co. 84p. Catalog 830 describes and illustrates electric vibrating feeders and con-

PRODUCTION IDEAS (Cont.)

veyors for mass handling of bulk materials.

12-23 Turbine-type Pumps — Ingersoll-Rand Co. 8p. Form 7228 describes vertical turbine-type pumps suitable for bulk liquid transfer, dewatering, similar jobs.

12-24 Steel Data—Babcock & Wilcox Tube Co. Data Cards 102-F and 149 give detailed data on creep stress of Croloys and on properties and treatment of alloy steel tubing.

12-25 Switchgear — International General Electric Co. 32 and 24p. Catalogs GEA-3083D and GEA-2596E describe metal-clad switchgear with Magne-blast air circuit breakers and metal-enclosed switchgear with drawout air circuit breakers.

12-26 Making Aluminum—Reynolds Metals Co. 16p. Electrolytic reduction process of producing aluminum pig is described for new Jones Mills plant.

12-27 Fire Protection — National Foam System, Inc. 28p. Catalog describes chemical foam protection, foam generators and auxiliary equipment, and fire-extinguishing chemicals.

12-28 Power Trucks—Elwell-Parker Electric Co. 12p. Condensed general catalog covers high- and low-lift platform trucks, fork trucks, and mobile cranes.

12-29 Filters Air—Trion, Inc. 8p. Electric air filters for industrial, commercial, and residential uses are described in form E-22.

12-30 Industrial Trucks at Work—Baker-Raulang Co. 16p. Eight case studies cover metalworking (reports 241, 242, 243, 271, 281), processing (351), and warehousing (3061, 3062). Ask for studies wanted.

12-31 Steam-trap Selector—Yarnall-Waring Co. 20p. Bulletin T-1750 tells hows to pick the right trap for the job.

12-32 Belt-conveyor Equipment — Chain Belt Co. 42p. Latest designs and developments in idlers, trippers, take-ups, rotary cleaners, and pulleys are covered in bulletin 51-81.

12-33 Electronic Instruments—Dawe Instruments, Ltd. 97p. Folder of bulletins includes many types of electronic instruments for industrial, communication, and photographic applications.

12-34 Milling Machine—Cincinnati Milling Machine Co. 20p. Tool and die miller (8x18 in.), its features, and attachments are treated in bulletin M-1731.

12-35 Operating Winches—Hyster Co. 12p. Form 1184 takes operator from fundamental instruction on winch operation to problems met in woods and on difficult terrain.

12-36 Copper-base Alloys—Lunkenheimer Co. 16p. Booklet describes alloys, manufacture, properties, general application.

12-37 Fine Grinding—Hardinge Co. 12 and 12p. Bulletin 25-C discusses rod mills for fine grinding. Bulletin AH-438 illustrates dryers, kilns, coolers.

12-38 Spiral-wound Gaskets — Flexitallic Gasket Co. 28p. Catalog tells how spiral-wound gaskets are made and keep tight seals. Data tables are included.

These manufacturers' catalogs will be sent free to subscribers. Fill in squares with catalog numbers desired and mail to the Editor, McGraw-Hill Digest, 330 W. 42nd St., New York 18, N. Y., U. S. A.

Good until March 1, 1952. (Part below MUST be completely filled in. Please TYPE or PRINT.)

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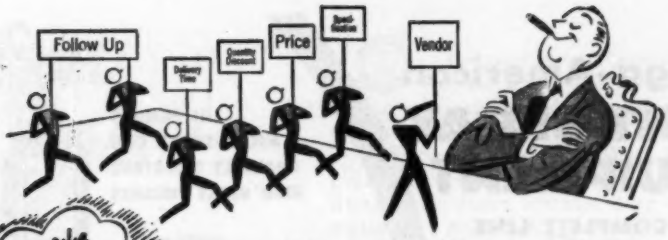

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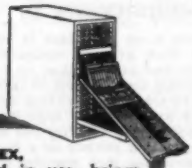

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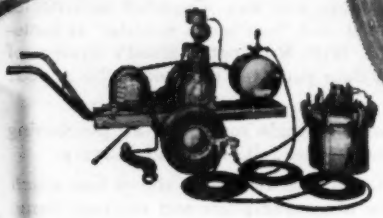

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They are low in initial and operating cost.
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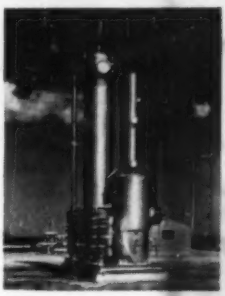

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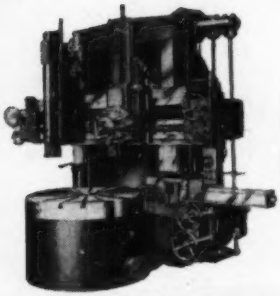

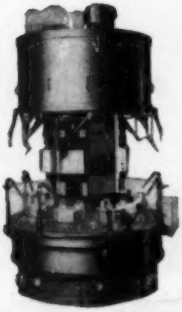

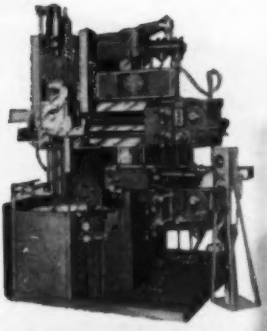

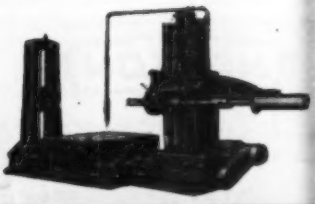

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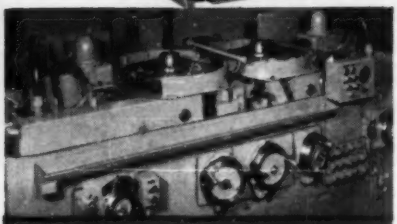

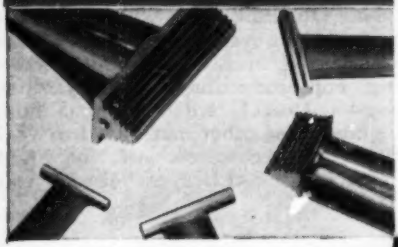

Dovetail and pinetree forms, in various sizes, are ground from rough forgings.

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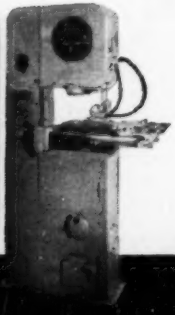

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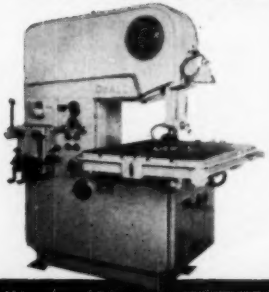

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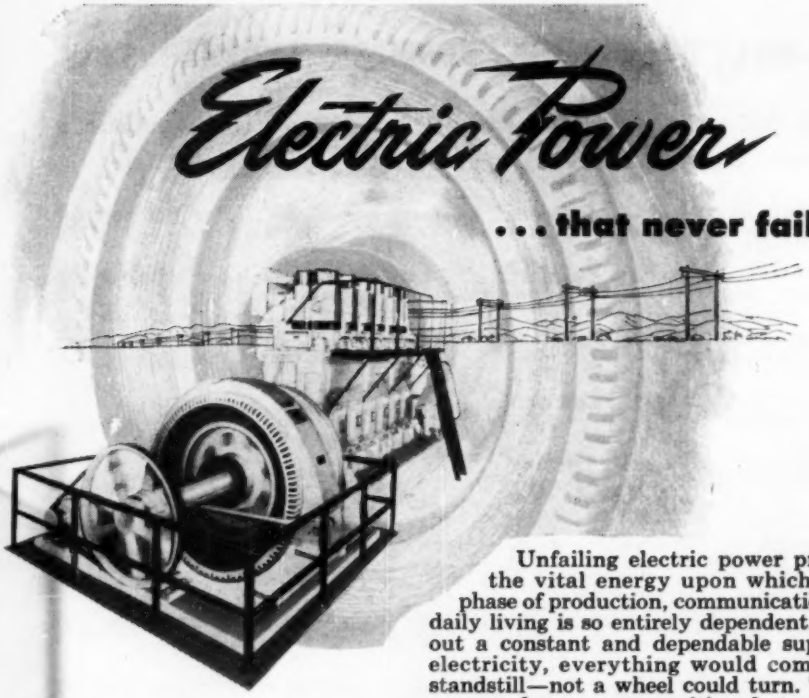

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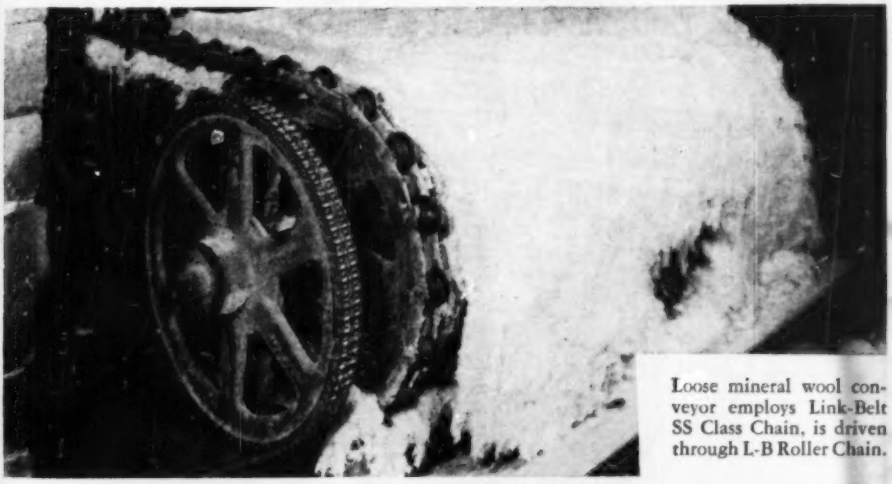

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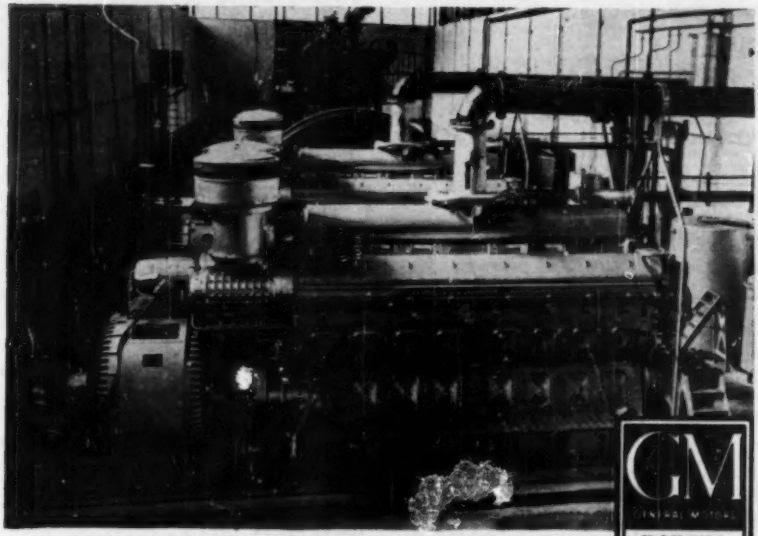

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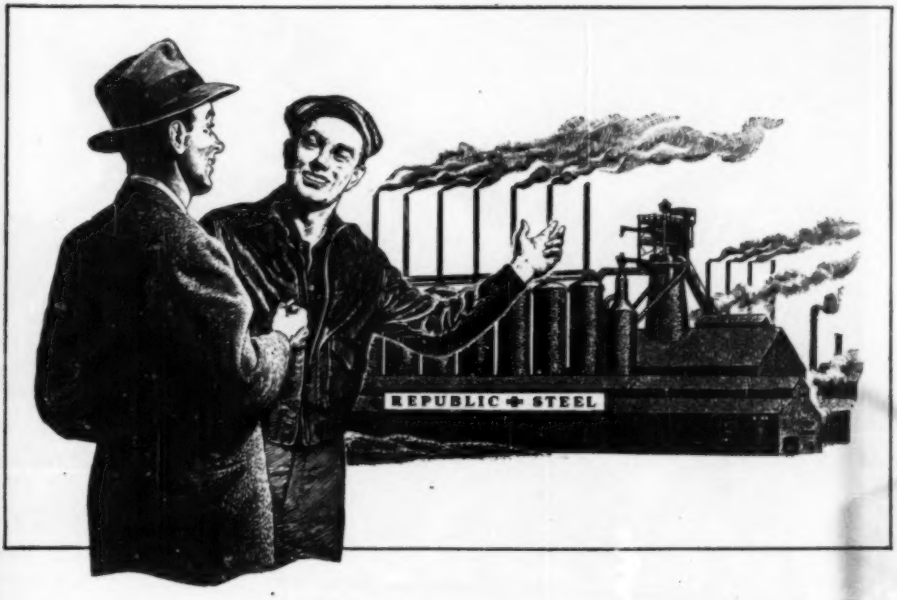

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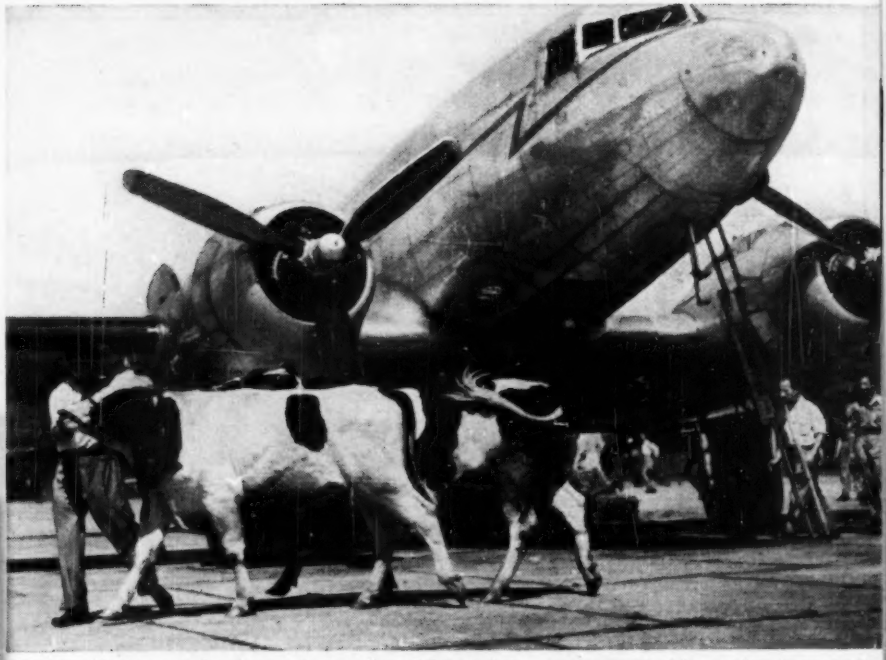

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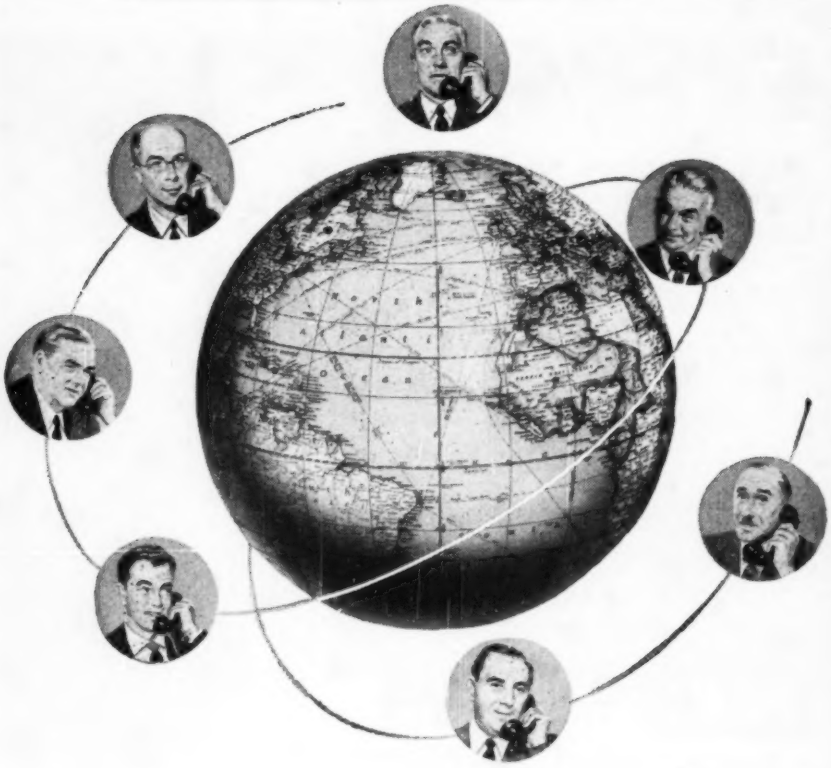

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